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Nursing Education—WOLF

Electrical Stimulation of Muscles—
OSBORNE, KOSMAN, BOUMAN, McELVENNY AND IVY

Crutch Walking Device—BROWN AND PHILLIPS

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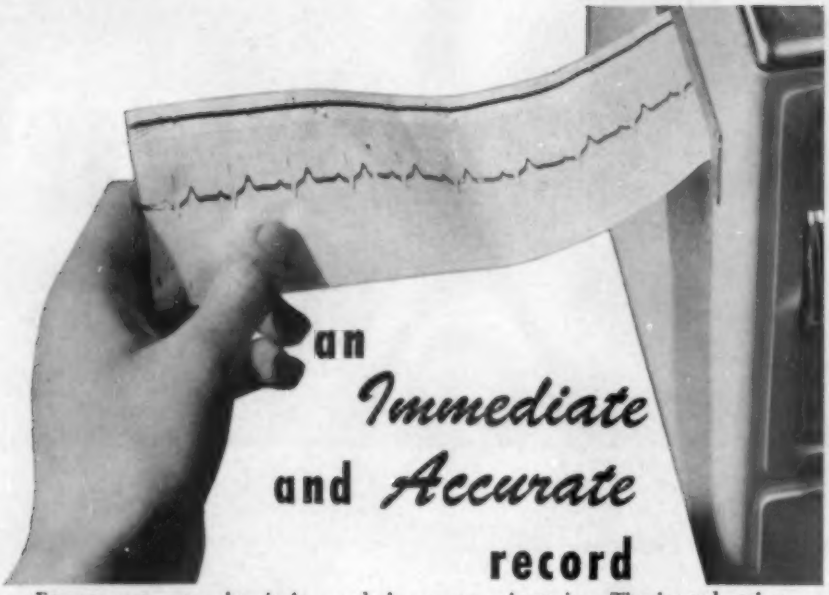

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Integration of Principles of

Body Mechanics and Posture in Nursing

Demonstration Project at Vanderbilt University School of Nursing

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The integration of principles of posture and body mechanics in the basic nursing curriculum has a two-fold purpose. First, to help the student gain an understanding of the principles of body mechanics and posture which are basic to health, so that she will apply these principles in her own daily activities and rest. Second, to guide the student in the application of these principles in the nursing care of all patients, as well as in health teaching.

Basic instruction in posture is given in the first term of the first year as a part of the course in personal health conservation, which is designed to guide the student in the development of sound physical, mental and social habits. Twenty hours have been designated for posture, five hours of lecture-demonstration and fifteen hours of laboratory.

Equipment used in the laboratory consists of one wall mirror 60 x 40 and three mirrors 60 x 24 mounted on casters, several plumb lines, mats for exercises, a table 72" long and 30" high, tape measures, visual aids, a blackboard and a skeleton.

Following the students' physical examination in which a general examination of posture is included, posture silhouettes are made of each student of lateral and back views. The silhouette is a valuable aid to the student in learning to analyze postural alignment and in understanding her own posture needs. It also serves as an objective record of her postural alignment.

In presenting a concept of good posture, principles of balanced posture are discussed and tests are made in the laboratory to show the part played by muscular action and mechanical adjustments of the skeleton in the maintenance of the erect position. The interrelationship of the various parts of the skeleton and their arrangement over the center of gravity are considered with regard to economy of muscular effort and the prevention of joint strain.

In the laboratory the students' postural alignment is analyzed by the instructor. The student stands between two mirrors which are so placed that she may see her front view and lateral view without changing position. The analysis is interpreted to the student who records it on a record which serves as a basis for determining her individual posture needs (Figs. 1 and 2). At this time the only corrective measure suggested is that of standing and walking tall and of centering the weight over the center of gravity. In subsequent laboratory periods the student analyzes her own alignment between mirrors, with and without the aid of the instructor. In addition, students make

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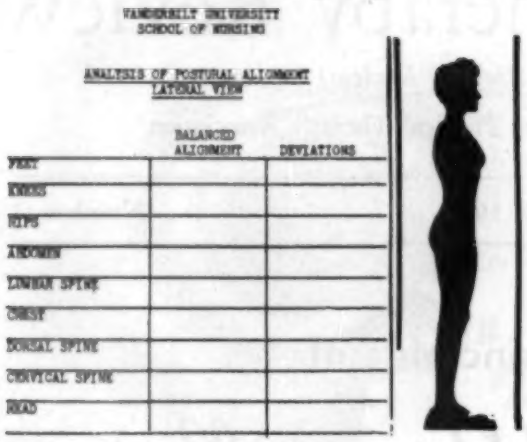
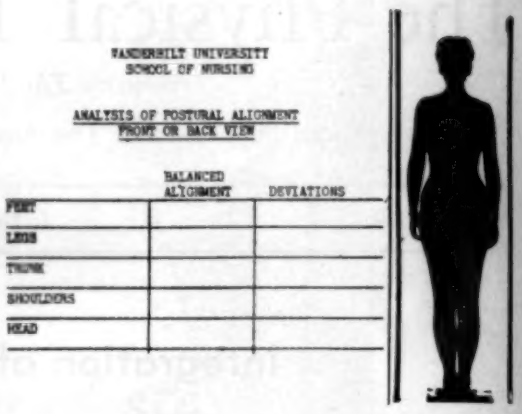

VANDERBILT UNIVERSITY
SCHOOL OF NURSING

ANALYSIS OF POSTURAL ALIGNMENT
LATERAL VIEW

	BALANCED ALIGNMENT	DEVIATIONS
FEET		
KNEES		
HIPS		
ABDOMEN		
LUMBAR SPINE		
CHEST		
DORSAL SPINE		
CERVICAL SPINE		
HEAD		

Figure 1.


VANDERBILT UNIVERSITY
SCHOOL OF NURSING

ANALYSIS OF POSTURAL ALIGNMENT
FRONT OR BACK VIEW

	BALANCED ALIGNMENT	DEVIATIONS
FEET		
LEGS		
TRUNK		
SHOULDERS		
HEAD		

Figure 2.

analyses of each other with plumb lines that are placed in various parts of the laboratory. In this way they observe variations in so-called "normal postures."

It is not the purpose of this course to develop specialists in posture correction but to enable the student to recognize good and poor postural alignment so that she may help to prevent postural deformities, through health guidance and other nursing activities.

To determine other posture needs of the student, tests are made in the laboratory to determine muscle tone and range of motion in the lumbar, dorsal and cervical spine, and in the extremities. The findings of the various tests form a basis for a general conditioning program consisting of exercises for muscle tone and flexibility, and measures for the development of good posture habits. Laboratory classes have been limited in number to permit variations in activities according to individual needs of the students.

An individual conference with each student in regard to her silhouette serves as a guide to instruction given in the laboratory. In the laboratory periods technics of relaxation are introduced and serve as a balance between rest and activity. There is ample opportunity for the consideration of muscle function, joint motion and terminology which the student will encounter throughout nursing. If, at this point, the student understands the need for dorsal flexion in walking she will have a basis for the prevention of foot drop. If she analyzes the movements required in combing the hair, she will have some awareness of the need for functional range of motion in the upper extremities. Similar applications are made to other functional activities.

As the student learns that the maintenance of any one position for a long period of time contributes to fatigue, she realizes that frequent changes of position are desirable. In her own activities she finds that the alternation of activities requiring standing and sitting considerably reduces fatigue. In an effort to reduce the fatigue caused by standing, experiments are made in standing with one foot slightly ahead of the other, to broaden the base of support and enable a shift of weight from one foot to the other.

Analysis is made of gait when walking toward a mirror. Demonstrations by students of walking with heels of various heights is stimulating to discussion. The effect of posture, gait and shoes on fatigue, back strain and foot strain also are considered.

The fact that students find sitting in classes tiring provides a good opportunity for investigation of the factors involved. In addition to ten minute recesses between classes, a stretch of a few seconds at twenty to thirty minute intervals seems helpful in reducing fatigue. Other factors investigated are the measurements of chairs, heights of desks, lighting and ventilation. In the laboratory the principles of body mechanics in sitting are discussed, and analyses are made of the alignment of various students in chairs of different sizes and types. Each student determines the measurements of a desk and chair to meet her own needs and makes adjustments in furniture in her own room where possible. Several footstools and student chairs for the left-handed have been provided in classrooms. In considering habits of posture when sitting, measurements are made of the space between the umbilicus and the xiphoid process of the sternum in good and in poor posture. The term "long and

short midriff" has become useful in laboratory jargon. These experiences in the classroom and laboratory serve as a basis for an understanding of the needs of individuals of all ages in regard to seating.

The principles of body mechanics in reaching, stooping, bending, lifting and moving objects are approached in a similar manner. Discussion of principles is combined with laboratory practice or problems which may be solved in or out of the classroom. The observation of activities done between mirrors, or observation of the class in various types of activity, makes the analysis of body action more meaningful to the student. Emphasis is placed on the prevention of fatigue, strain and the development of postural deformity. The application of these principles is brought out through the assignment of problems such as packing and carrying heavy suit cases, lifting a baby from the floor, bending over low wash basins or beds, and moving an ill person in bed.

Positions of rest are analyzed from the anterior and lateral views in back lying, side lying and face lying. The effects of beds, springs and mattresses are considered in relation to posture and health. Frequency and amount of rest is discussed in relation to the prevention of fatigue.

Opportunity is provided throughout the term for the student to have guidance in the development of habits of rest and activity which should serve as a valuable foundation for the nursing care of patients.

The preparation of the faculty members responsible for the integration of posture and body mechanics in preclinical and clinical nursing is essentially the same as that of the students. In addition, nursing procedures are reviewed and revised as indicated in relation to principles of body mechanics and posture. The physical therapist is available to the faculty for consultation and assists the nursing instructors in guiding students in the nursing arts laboratory, in ward classes and in guiding the student at the bedside. The following chart has been a guide for evaluating posture in rest and activity and has been helpful to the faculty in evaluating student performance:

VANDERBILT UNIVERSITY SCHOOL OF NURSING

THE INTEGRATION OF POSTURE AND BODY MECHANICS IN NURSING

Guide for Nurses in Evaluating Posture and Body Mechanics

I. Posture and Body Mechanics in Activity	
A. Standing	Balanced alignment of feet, knees, hips shoulders and head from anterior or posterior and lateral views. Position of abdomen and chest. Alignment of spine.
B. Walking	Alignment of feet, legs, trunk and head as in standing. Smooth heel to toe gait.
C. Sitting down in chair	Alignment of feet. Balanced distribution of weight.
D. Sitting (rest)	Alignment of head and trunk. Hips flexed at right angles. Feet flat on floor.
E. Sitting (activity)	Alignment as in D. Bend forward at hips.
F. Reaching upward	Balanced alignment. (Note position of lumbar spine)
G. Stooping and bending	Base of support. Alignment of knees, hips and trunk. Distribution of weight. Contraction of abdominal and gluteal muscles.
H. Lifting and moving objects	Move or shift weight with minimal lifting. Avoid lifting at very high or very low levels. Reduce friction.
General considerations	Stand close to weight. Face in the direction of movement. Maintain correct alignment of lower back. Pull rather than push. Use mechanical bracing. Amount of weight lifted not to exceed 35 pounds. Broad base of support.
I. Lifting at low levels	Power from knees and hips. Head and trunk erect. Use mechanical bracing when possible.
J. Lifting at high levels	Maintain correct alignment of trunk. Keep weight close to body. Power from arms and shoulders.
K. Carrying objects	Alignment as in standing or walking. Arms close to body. Use large muscle groups.
II. Posture in Recumbency	
A. General considerations	Supportive measures to permit balanced alignment. Bed covering arranged to allow movement. Frequent change of position. Functional activity as permitted.
B. Back lying C. Side lying	Balanced alignment of head, trunk and extremities from anterior and lateral views.
D. Face lying	Balanced alignment of head and trunk from posterior and lateral views. Head turned to one side. Arms externally rotated and abducted. Knees extended or flexed. Feet relaxed in dorsal flexion.

In the nursing (arts) classes, laboratory, and orientation to patient care, the student nurse is given guidance in the efficient use of the body, both for the patient and for herself. The student's first experience in the nursing laboratory is in home nursing. In this she has the opportunity of making improvised equipment and making the adjustments necessary for the care of the ill individual in the home. In preparing the environment for the bed patient in the home, the height of the bed and bedside table is adjusted to secure an optimal working level.

In all of the activities involved in preparing the patient's unit and making the patient comfortable, habits of good posture are stressed. Factors in the prevention of fatigue and back strain for the nurse are: a rational balance between activity and rest; the arrangement of equipment to prevent unnecessary standing, stooping and bending; having the patient close for the bath, the back rub, and other types of care; moving rather than lifting the patient, and efficient use of her own body. Realizing that there are many variations in the application of principles of body mechanics in each nursing procedure, it has seemed expedient to work out in detail the application of principles in relation to certain procedures. Several examples are given in the following paragraphs.

REMOVING THE PILLOW

Figure 3.

In removing the pillow for the patient who is unable to lift himself, the nurse stands facing the patient with her body in good alignment and her feet placed so as to give a stable base of support. She contracts the abdominal and gluteal muscles and shifts her weight to the forward foot as she places one hand under the patient's neck and shoulders (Fig. 3). As the patient is lifted the nurse shifts her weight to the rear foot and supports the patient while removing the pillow with the other hand.

The Body Mechanics of the Nurse when TIGHTENING BED LINEN

Figure 4.

In stooping to tighten bed linen, a broad base of support is used, the hips and knees are flexed, the abdominal and gluteal muscles are contracted, and the trunk is held erect. In this, as in moving and lifting the patient, the nurse braces one thigh against the side rail of the bed (Fig. 4) to protect her back from strain. When it is necessary to lift the patient, judgment must be used in the amount of weight each individual should lift. In a number of states there are laws which prohibit women from lifting weights exceeding 25 to 35 pounds. The implications here might well be considered by instructors of nurses. Various methods of moving patients by turning or rolling, the use of lifting sheets and other mechanical aids, are demonstrated and analyzed with relation to the fundamental principles involved. The ease with which a patient

may be pivoted to the sitting position for dangling is dramatic in comparison to other methods. One nurse standing at the head of the bed may move some helpless patients up in bed without assistance, by using a lifting sheet which extends from mid-thigh to the top of the head. If two nurses are required it is much easier to stand at the head of the bed and pull the patient up on the lifting sheet than to stand at the side of the bed and push or lift the patient up in bed. The latter method puts the nurse in a position of disadvantage; she is facing one direction and moving in another, in addition to the fact that pushing is harder than pulling. By standing at the head of the bed she may brace her thigh against the bed which gives her a mechanical advantage and prevents the bed from moving as the patient is moved.

The students acting as both the patient and the nurse in laboratory practice are given an understanding of the importance of maintenance of physiologic position during illness. When giving nursing care, especially the bath, observation is made of the patient's range of motion in order that any limitation may be detected early. Practice in the placement of pillows, foot boards and other types of support is related to the fundamental principles of good posture and body movement. The alignment of the patient is analyzed in the back lying, side lying and face lying positions, and the values of good alignment are discussed. It is important for the student to understand the balance between rest and activity that is necessary for the optimal health of the patient. This understanding will enable her to realize that it is quite as important for some patients to move and do things for themselves as it is for others to relax and be completely inactive. In this connection it is important for her to realize that she herself will conserve her energy by working in as relaxed a manner as possible.

As the various procedures relating to patient care are demonstrated in the laboratory, analysis is made of the body mechanics of the patient and the nurse with a view to the most efficient use of the body. These procedures include such activities as: placing the patient on the bed pan; giving the bath and the back rub; the administration of hypodermics and oral medications; taking the blood pressure; the use of the wheel chair, and moving the patient from the bed to the stretcher.

Following this preparation, the student is oriented to the care of the patient in the hospital. Principles of posture are integrated in the guidance given in total nursing care by the nursing instructors to whom the physical therapist is available as necessary.

In each of the clinical nursing areas there are further opportunities for the application of principles of posture. The basic preparation is designed to give the student a good foundation for more complex situations.

The nursing care of the surgical patient, whether in general surgery, neurosurgery or orthopedics, presents many problems which may be greatly simplified by an understanding of the mechanical functioning of the body. The moving and turning of the postoperative patient, the turning and positioning of the patient in a hip spica cast or in Crutchfield tongs, is facilitated for the patient and the nurse if the nurse is skillful. Joint motion is reviewed in relation to specific surgical conditions, and various nursing measures are used to prevent limitation of motion. The indications for rest or activity are considered in each patient in relation to the plan for medical care. Technics of simple crutch walking are demonstrated and each student learns to use crutches correctly.

In medical nursing as in all areas of clinical nursing the fundamentals of body mechanics are the same. The patient and the type and stage of his illness will influence the application of these principles. The absolute rest and relaxation necessary for the tuberculous patient will differ greatly from the needs of the ambulatory patient with diabetes. Some conditions in which students have experience in medical nursing and which present opportunity for the application of the principles are: cerebral accident, meningitis, acute poliomyelitis, conjestive heart failure, asthma, peptic ulcer, pernicious anemia, and nephritis.

Obstetric nursing affords an opportunity to guide the patient during the complete maternal cycle. In the outpatient department mothers' classes are taught, in which factors having special significance to posture and body mechanics are included. Discussion of shoes, clothing, exercise and rest are included in the hygiene of pregnancy, as well as body mechanics in the daily activities which the patient performs. During labor and delivery various methods are employed in making the patient comfortable. Lifting and moving unconscious patients from delivery tables is facilitated for the nurse by rolling patients when permissible, or by the use of lifting sheets.

In relation to the appraisal of the newborn, slides are shown of congenital anomalies, so that the nurse may have a keen ability to recognize any deviations which may be encountered.

In the nursing care of the postpartal patient, health guidance includes: early activity in bed, frequent change of position, position for nursing the

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baby, holding or lifting the baby, exercises for abdominal and gluteal muscle tone, getting out of bed and walking. In demonstrating the baby's bath to the mother, factors of significance to posture are included, especially the arrangement of equipment to prevent unnecessary bending and stooping.

The study of normal growth and development of children, with a period of guided experience in the nursery school, gives the nurse student an excellent opportunity to observe posture in children. This experience and the comparison of infants in the "well baby clinic" with children who are ill makes her aware of the many factors that influence posture early in life. In the nursery school she becomes aware of the effect, psychologically as well as physically, of chairs, tables, and other physical equipment scaled to meet the needs of the growing child. Classes in health guidance are given for parents in the outpatient department by nurse students. The factors influencing posture are included in these classes.

The care of the child who is acutely or chronically ill presents problems for the nurse that differ from those encountered in the care of the adult patient. Considerable ingenuity is required to accomplish a balance between rest and activity and to maintain positions that are desirable in relation to the child's posture needs. In the nursing care of the child, posture is considered on an individual basis, with variations in application to meet the needs of each patient. Guided experience in the care of children with disturbances of the musculoskeletal system, such as poliomyelitis and arthritis, gives the student experience which is valuable in the care of all patients.

In the student's experience in public health nursing there are many opportunities in health teaching in the home, the clinic and the school for the inclusion of principles of good posture. As the school nurse she may act as consultant on such matters as seating, lighting, rest and other factors pertaining to health. Her experience in orthopedic nursing enables her to recognize postural defects and expedite their referral for medical treatment. Her understanding and experience in obstetrics enables her to make adjustments in the home to facilitate the care of the antenatal and postpartal patient. Thus the preparation of the student throughout the preclinical and clinical periods is designed to give her a background that will enable her to meet adequately her responsibilities in health teaching and in nursing, in the hospital and in the home.

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St. Luke

October 18 is the Feast of St. Luke, who among all saints is the patron saint of physicians. Luke was referred to by St. Paul as "My beloved Luke, the physician." By strange coincidence, when William Harvey of England entered the medical school of the University of Padua in Venice in 1598, it is recorded that the academic year began on October 18 with a celebration of mass in honor of St. Luke. In the Book of Luke he makes it clear that to him individuals always take precedence over masses of men. He records that "when Christ at the end of a particular day was confronted with a great mass of the sick, 'He, laying His hand on every one of them, healed them.'" It was the individual with whom he was concerned rather than the mass. Without entering into any theologic discussions concerning whether or not Luke was actually a physician or actually the author of the portion of the New Testament accredited to him, he represents today the very embodiment of the highest type of physician. Those who would reduce human beings to a common entity, treat them without regard to individual humanity and spirituality, might well realize that the great majority of physicians today have learned the importance of the individual when his health and life are concerned and that that has come down to us through many hundreds of years.—*From "Journal of the American Medical Association," November 6, 1948.*

Nursing Education

Lulu K. Wolf, R.N., B.S., M.P.H.

In 1873, when the first schools of nursing were established in this country, treatment rather than prevention of disease was the primary motive of nursing. The germ theory of disease had only just been discovered and the threat of epidemics and plagues was constantly at hand. There were no graduate nurses available for employment in hospitals; consequently, the nurse in training worked long hours to care for the hospital's sick. Organized teaching, with class and laboratory periods, was rarely, if ever, to be found in those early schools. The "student" (for such she was called) learned the care of patients as best she could and more often than not she acquired her nursing skill by the expensive trial and error method of learning. When the needs of the hospital demanded it, the student provided nursing care "around the clock" and her duties consisted of such things as bedmaking, bathing and feeding patients, applying poultices or dressings, and keeping the hospital tidy and clean. The function of the nurse in those days and the objective of her entire training period was the care of the hospitalized sick.

Today the barriers between treatment and prevention of disease have been broken down. With the introduction of sound measures of communicable disease control, initiated at the beginning of the twentieth century, the burden of sickness and death in the total population was greatly reduced. In the past fifty years, while the death rates from tuberculosis and pneumonia were being lowered, other diseases of an infectious character, such as typhoid fever, scarlet fever and diphtheria have been practically eliminated as public health problems. Medicine has become preventive medicine and a new attitude toward health has been developed. The ideal of medicine in present-day society is prevention of disease. The goal of nursing is envisioned in terms of promoting health and bettering the conditions under which people work and live.

Although the large majority of the 1,245 state-accredited schools of nursing in this country are at present hospital-owned and require only high school graduation for admission, there is a growing tendency on the part of nursing schools to become associated with colleges and universities and to require one or more years of college for admission. A few schools of nursing have developed to the point of becoming integral parts of universities and four collegiate schools have attained the goal of joint accreditation by the National League of Nursing Education and the National Organization for Public Health Nursing. This means that the programs offered in these four schools—Skidmore, Vanderbilt, Yale and University of Washington—integrate all phases of health, disease prevention and rehabilitation. It also means that the graduates of these basic programs of nursing are qualified for staff level public health nursing as well as for hospital nursing.

Patterns of nursing education differ widely in scope, content and student activities, and the length of the professional curriculum varies from two and one-half to three calendar years. If the school requires two years of college for entrance, or if it gives a combined program of collegiate general education and professional education, a baccalaureate degree is awarded. In one school of nursing which requires four years of college for entrance, the degree of Master of Nursing is awarded.

Because patterns of nursing education do differ so greatly, and because nursing schools, as they have existed in the past, have not produced community-minded nurses, a study of the whole education of the nurse is now going forward. Under the sponsorship of the National Nursing Council and the directorship of Dr. Esther Lucile Brown, a report is being prepared on who should organize, control, administer and finance professional nursing education. Since nursing is of such importance to the welfare of the nation, the Carnegie Corporation has provided financial support for this study.

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THE NATIONAL NURSING COUNCIL'S SCHOOL STUDY

The "School Study" got under way in April of 1947 when nineteen representatives of nursing service, that is, graduate nurse practitioners, were brought together for a ten-day workshop in New York City. These nurses represented public health, industrial, institutional and private duty nursing and the field of rehabilitation. Their job was to prepare a description of the areas in which the professional nurse should function as determined by present-day health needs. Opinions were presented, and eventually these were classified into pertinent categories such as concepts, information, skills and attitudes needed by the professional nurse. A report of the workshop discussions was prepared by Doctor Brown in the form of a memorandum titled, "Nursing in the Second Half of the Twentieth Century."

Before discussing any program of nursing education, it seems wise to consider the kind of person the professional nurse of today should be, the knowledges and skills she should have, and the functions she should be able to perform. Since the workshop definition of the professional nurse was accepted as a basis for discussion at the three School Study Conferences held in Washington, San Francisco and Chicago, it is the definition chosen for discussion here.

THE PROFESSIONAL NURSE OF THE FUTURE[1]

(Workshop definition)

"It is the opinion of this group that in the latter half of the 20th century, the professional nurse will be one who recognizes and understands fundamental needs of a person, sick or well, and who knows how these needs can best be met. She will possess a body of scientific nursing knowledge which is based upon and keeps pace with general scientific advancement, and she will be able to apply this knowledge in meeting the nursing needs of a person and a community. She must possess that kind of discriminative judgment which will enable her to recognize those activities which fall within the area of professional nursing and those activities which have been identified within the fields of other professional or nonprofessional groups.

"She must be able to exert leadership in at least four different ways: (1) in making her unique contribution to the preventive and remedial aspects of illness; (2) in improving those nursing skills already in existence and developing new nursing skills; (3) in teaching and supervising other nurses and auxiliary workers; (4) in cooperating with other professions in planning for positive health on community, state, national and international levels.

"To understand the characteristics and aptitudes which are needed by the effective professional nurse, it is necessary to visualize her in action against the back-drop of a rapidly changing and increasingly complicated civilization. In past eras nurses, like other groups, have often been expected to fit into traditional niches in a relatively static situation. In that kind of society the nurse might fill her place satisfactorily if she were a passive, obedient and unquestioning individual. In a rapidly changing world the nurse's activities will require that she be alert and self-directing. The professional nurse must be able to readily evaluate behavior and situations and function intelligently and quickly in response to their variations. She must not only recognize physical symptoms of illness which are commonly identified with organic changes, but she must also recognize those heretofore less considered manifestations of illness such as anxieties, conflicts and frustrations, which have a direct influence on these changes and are now thought to be the result of an incompatible interaction between a person and his environment. Nurses in their longer contacts with individuals have more opportunities to observe behavior and to listen to expressions of thought under varying conditions than do physicians whose contacts are necessarily intermittent and brief. For this reason the nurse must be able to direct her actions and her verbal expressions on the basis of a sound understanding of human behavior and human relationships. If the nurse does not have this quality of understanding and cannot use it to deal effectively with persons, she may contribute to illness or invalidate the efforts of other professional workers."

1. National Nursing Council, Inc.: Nursing in the Second Half of the Twentieth Century. Memorandum prepared for Dr. Esther Lucile Brown by Participants in the Workshop Connected with the "School Study," April 16-25, 1947.

Since the function of the nurse in 1948 is very different from the function of the nurse as it was conceived in 1873, her training or education is likewise very different. Where formerly, the attention of the nurse student was focused almost entirely upon the bedside care of the sick or acutely ill, today her efforts are being directed toward preventing illness and defect and improving the lot of the chronically ill. Obviously, the old pattern of on-the-job hospital training will not suffice to prepare the nurse for this wider sphere of activity. If she is to function in the broad field of community health service, her learning activities must include something more than the technics of bedside care of the sick. She must know the technics of teaching, be competent to judge the health needs of individuals, and be capable of initiating action to meet these needs. Many schools of nursing are now experimenting with these enriched programs of basic nursing education, and as these schools prove themselves sound, other schools undoubtedly will follow suit.

THE BASIC PROFESSIONAL CURRICULUM

The basic professional curriculum is designed to prepare young women for the broad field of community nursing service. Through course content, field trips to community agencies, observational visits to the homes in urban and rural areas, and guided practice in the care of patients and their families in the hospital, outpatient department and home, the student learns how to analyze the health needs of the people and how to initiate action to help them meet their needs.

The curriculum is divided into a *preclinical*

period which extends over the first six to nine months, and a *clinical period* which covers the remaining twenty-seven to thirty months. Upon completion of the professional course the student is awarded a diploma or a degree in nursing depending upon the admission requirements and the nature of the program.

THE PRECLINICAL PERIOD

During the preclinical period the student is given an opportunity to learn the full meaning of health and healthful living. Through her study of the biological, physical, health and social sciences she acquires a knowledge of the social, emotional and physical needs of individuals and gains some understanding of the many opportunities for preventing illness and teaching health. In addition to learning about personal health and preventive measures, the student is given an opportunity to study the community and to learn what resources are available to help the individual and his family meet their needs. Through her observation of the various types of community health agencies, she sees the relation of her work to the welfare of society and comes to understand the scope and function of other members of the health team—the physician, dentist, teacher, social worker, physical therapist and sanitary engineer. Guided visits to patients in their homes help her to see the interrelationship between illness, housing, working conditions, nutrition, economic status, leisure time activities, cultural traits and community health practices, and thus she can visualize nursing as health conservation as well as service to the sick.

When the student has gained this concept of nursing and has been oriented to the work of the hospital as a community health agency, she begins her study of hospital bedside nursing. While learning the meaning of disease and its manifestations, she also learns how to bathe patients, observe and record their symptoms and physical signs, give them drugs and treatments as needed, and assist the physician in various forms of medical therapy. She learns many different ways of making patients comfortable and of providing them with suitable forms of physical and diversional activity. As she progresses in the nursing course, she assumes full responsibility for the nursing care of selected patients and, occasionally, she may have the opportunity to visit a patient in his home after he has been discharged from the hospital.

THE CLINICAL PERIOD

During the clinical period the student learns how to care for patients and their families in the medical, surgical, pediatric, obstetric and psychiatric divisions of the hospital, in the clinics of the outpatient department, and in the homes of the community. These experiences include the care of patients with mental illness, with medical and surgical conditions, and with conditions that are communicable. They also include the care of the mother and baby during pregnancy, labor, delivery, and the puerperium, and the care of the child. With the help of the clinical instructor and/or the head nurse, the student learns how to analyze the patient's needs and how to plan and execute a program of nursing care to meet those needs. This experience in the care of the sick includes learning how to modify the patient's diet; to provide for his personal cleanliness and his needed rest and recreation; to safeguard his expenditure of energy; to encourage his return to health and activity, and to guide him in planning for and carrying out a program of activities designed to facilitate his recovery and rehabilitation.

While learning to give safe maternity care, the student also learns how to help the obstetric patient meet her day-to-day problems and adjust her activity to meet the needs of her mind and body, her baby's needs, and the needs of her family.

Similarly, the study of pediatric nursing gives the student an understanding of the child, his physical, mental, emotional and social growth and development. After learning the growth pattern of the well child, the student is given an opportunity to care for the ill child, and to help him adjust to the limitations imposed upon him by his disease.

To round out these learning experiences and to help her apply all of her knowledges and skills, many schools provide the student with an experience in public health nursing. During this period she learns how to adjust her nursing technics to the home situation, and how to guide the family in its efforts to procure and maintain health. She also secures practice in cooperating with other members of the health team and in utilizing community resources to help families meet their needs.

All of these class and clinical experiences total 44-48 hours per week. While the student is learning the care of patients in the hospital, she is also doing the *work* of the hospital. Because of this arrangement which is peculiar to schools of nursing and hospitals, the educational program of the student nurse is almost entirely subordinate to the needs of the hospital. Many attempts have been made to improve this situation and to separate hospital nursing service and nursing education. To date there is only one school in this country which is organized to carry forward its program of nursing education with complete separation of nursing education and hospital nursing service. And this program* did not become effective until July 1, 1948.

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Since "working for maintenance" has always been considered a necessary part of nursing education, student nurses represent a constant labor supply for hospitals and thus their time for learning and for nursing practice is conditioned by the needs of the hospital. This system of on-the-job training creates problems in curriculum planning and curriculum implementation and limits the kinds of learning activities the student can be required to perform. Nurse teachers in schools of nursing are familiar with these problems and know how they condition the learning of the student, but teachers from fields other than nursing frequently do not understand the system of basic nursing education and thus they encounter great difficulties when they attempt to function in a nursing school program.

This backward apprenticeship system of education will undoubtedly undergo change and reformation once the current School Study findings are published, but until these changes come about, teachers of nurse students must work within the limitations of the present system.

Irrespective of the many problems relating to the organization, administration and control of nursing schools, there is evidence that the education programs within these schools are being enriched and strengthened in several ways. Within the past ten years, public health nurse experts have been brought into schools to incorporate the social and health aspects of nursing in the basic program and more recently, the physical therapist has been asked to join the faculty to help integrate the principles of body mechanics and posture fundamentals in nursing.

THE INTEGRATION OF POSTURE FUNDAMENTALS IN NURSING

The job of the physical therapist in this respect is to help the student learn how to use her body safely and efficiently so that she will be able to perform her daily living and working activities without undue fatigue, backstrain or postural defects. How the principles of good body mechanics are taught and practiced in any school of nursing will depend upon the way the school is organized, the aim of the curriculum, the type of students to be taught, the methods of teaching utilized by the faculty, and the preparation of the faculty.

In every school of nursing in which the physical therapist functions, however, the instruction, demonstration and practice of posture fundamentals should be placed early in the curriculum and should be taught as an integral part of the course in "personal health conservation." Not until the student learns how to maintain good posture and practice good body mechanics in her own activity and rest can she incorporate this knowledge and ability in her nursing activities.

In addition to teaching the preclinical students "posture in health", the physical therapist also will be required to provide similar instruction for the faculty who teach the students during the preclinical period and who guide them in the care of patients during the clinical period. Unless the nurse faculty members know and practice these principles, they will be unable to integrate them in their teaching and evaluate and direct the students' use of them in their day-to-day care of patients.

To help the physical therapist function smoothly and effectively in the nursing school program, it is essential for her to be oriented to the organization and administration of nursing education and nursing service, the curriculum, and to the work of each faculty member. This can be accomplished through conferences and through observations of classes and clinical teaching activities. When the physical therapist understands how the school functions and what each faculty member contributes to the student's learning, she should be able to visualize the needs of the faculty and the students as well as the patient's needs in relation to nursing care and plan her teaching accordingly. On the other hand, the nurse faculty members will be able to help her plan her teaching and guidance of students so that it can be fitted into the program with a minimum of disturbance in the ward situation.

After the program is initiated, regular committee meetings of the nurse faculty members and the physical therapist should be scheduled to provide for a review of progress, the interchange of ideas, the revision of teaching content, and planning for the future.

Through the medium of such joint action, it is possible to review all nursing procedures, demonstrate them, evaluate the performance of them in terms of safe body mechanics, and revise them as needed for the welfare of the nurse as well as the patient. Joint activities of this type facilitate the acceptance of new ideas, promote good working relationships, and help the nurse and the physical therapist recognize the contribution each is prepared to give.

Electrical Stimulation of Muscles:

In Treatment of the Acute and Chronic Forms of Anterior Poliomyelitis†

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Since 1940 research has been undertaken at Northwestern University Medical School to ascertain the therapeutic value of electrical stimulation for the denervated muscle. There have been three phases to the problem. The first phase was to find the kind of electrical current most suitable for stimulation of both the denervated and innervated muscle. Next, it was necessary to conduct well controlled animal experiments to determine the effect of such an electrical current on denervation atrophy and muscle strength. The results of these fundamental studies have been presented.[1,2,3] The third phase of the problem was to determine whether the results secured on animals could be duplicated in man. The present report is the result of such a study. Twenty patients afflicted with anterior poliomyelitis served as subjects. In one group of thirteen patients, designated as the "Late Group," treatment was commenced from six months to six years after onset of the disease. The remaining seven patients, designated as the "Early Group," were treated ten to thirty-four days after onset of the disease.

Methods

Late Group: Because patients were not available in the early stage of the disease when the experiment was started, it was necessary to select patients who had had anterior poliomyelitis for some time. However, this was an advantage because it enabled us to work out the technic to be used in stimulating the paralyzed or paretic muscles. It was important to have our technic mastered before undertaking treatment in the early stage. Thirteen late patients were selected for treatment. These patients had had the disease for periods ranging from six months to six years.

Early Group: Later, when the epidemic of 1946 occurred in Chicago, it was possible to select seven patients as soon as they entered the Chicago Municipal Contagious Hospital, and the diagnosis of anterior poliomyelitis was made. The same number of patients were selected as a control group. The selection of both groups was made on the basis of the muscles involved and the apparent extent of the paralysis. At this stage of the disease, it is obvious that such a selection is very artificial and open to much criticism. When two patients had the same muscle, or group of muscles involved, the patient whose muscles showed the lower grade in the muscle strength test was selected for treatment while the favored muscles of the other patient were used as a control.

Testing Procedures: As soon as the diagnosis of anterior poliomyelitis was made, and prior to treatment, the paralyzed or paretic muscles were given a manual strength test. The method used was that advocated by the National Foundation for Infantile Paralysis. The same physical therapist always made successive examinations on the same patient.

In addition, the muscles were tested for the reaction of degeneration. This test proved unsatisfactory, especially for children. The tests were difficult to duplicate, even though made by the same examiner.

Electromyograms were recorded.

Intensity-frequency curves of the muscles selected for treatment were taken.

Where possible, circumferential measurements were taken from a constant distance and from a set anatomical landmark.

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All of the above tests were repeated every three months until discharge. In addition, a subjective evaluation of the patient's progress was made.

Treatment: Once a patient was selected for electrical muscle stimulation, the muscles were stimulated daily for six days a week. The generator used—"Variable Frequency Wave Generator"—was built* to give a current form and range of frequencies which have been found[4] to be essential. With this generator it is possible to develop the maximum tension in the muscle with the minimum current intensity. The current delivered by it is sinusoidal in form. The frequency of the current can be varied from two to six thousand cycles per minute. It is possible to change gradually from one frequency to another while the patient is in the circuit. With frequencies from thirty to six thousand cycles per minute we find it more convenient to convert cycles per minute to cycles per second. Thus, it is less cumbersome to speak of one-half to one hundred cycles per second. When the current reaches a frequency of two to one hundred cycles per second, the current may be 100 per cent sinusoidally modulated or surged to prevent a continuous tetanic contraction of the paretic muscle without relaxation. Modulation of the fundamental sine curve prevents this and gives a graduated contraction similar to normal activity. The number of modulations per minute determines the contraction rate of the muscles stimulated. This current we have termed a "Modulated Sinusoidal Current" with a carrier frequency of two to one hundred cycles per second.

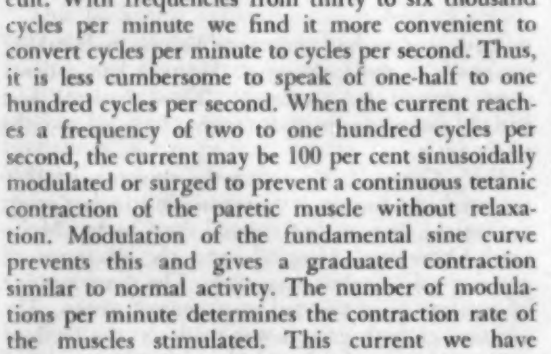

Figure 1.

The frequency to be used for treatment was selected from the intensity-frequency curve (Fig. 1). The frequency requiring the lowest current intensity for a threshold contraction was selected. This initial frequency was used until later examinations showed the muscle responded maximally to a different frequency. When the frequency was two or more cycles per second this fundamental wave was modulated as previously explained. The modulation rate (the rate at which the muscles contracted and relaxed) was maintained consistently at a rate of twenty-four times per minute throughout the entire course of treatment.

The complete technic of applying the electrodes to the muscles under stimulation was recently presented.[5] In some instances the unipolar technic was used while in others it was necessary to use a bipolar application. Patients differed a great deal, and one could never predict with precision just where the point of maximum muscle irritability would be found. When possible, the muscle was made to contract against resistance, either by working against a weight, or tying a foot, for instance, to the leg of the treatment table. Vigorous muscle contractions were secured. Each muscle, or group of muscles, was stimulated daily. The muscles were stimulated for ten minutes unless fatigue occurred. Contrary to clinical teaching there is no danger of stimulating to, or beyond fatigue, but it is a waste of time because, unless tension is developed in the muscle, treatment is useless. Stimulating a muscle four times with appropriate rest periods between stimulations has been found to produce maximum results. We stimulated the muscles only once daily.

The lower extremities of our patients appeared to have subnormal temperature; therefore, we found that a preliminary application of heat was desirable. We used a heat cradle of incandescent light bulbs for this purpose.

Since this study was concerned with human subjects rather than animals, it was believed unwise to eliminate the physical therapy treatment, other than electrical stimulation. Thus, all patients, including the control group, received treatment consisting of heat, passive stretching and muscle reeducation exercise three times weekly. Crutch walking was instituted as early as possible.

RESULTS

Late Group: It was possible to make accurate girth measurements of ten patients. Statistical analysis of the forty-five measurements taken show the increase to be significant and not due to chance. Six of these patients were in varying stages of pubescence—aged two to sixteen years—and hence growth changes would be expected, but of these six patients, it is notable that five of them showed a greater increase in the size of the treated extremity in the measurements recorded. These increases varied from 0.32 to 1.91 cm. A patient, aged twenty

*General Electric X-Ray Corporation, Chicago, Illinois.

years, was infected with anterior poliomyelitis in 1940. This patient had the usual physical therapy treatment until sent to our clinic in 1946. It is most interesting to note that the circumference of both thighs and both lower legs increased in size under treatment. It is also remarkable that it was possible to stimulate these muscles after such a long period of complete paralysis—except for the right gastrocnemius muscle. Another patient, aged thirty-five years, showed a change of 3.49 cm. for the treated arm. The triceps were the muscles stimulated. Still another patient was given treatment to both right and left upper and lower legs. The girth changes ranged from 2.86 to 4.76 cm. While one patient showed little gain for the treated muscles of the thigh and lower leg, he made improvement in strength and endurance.

The current, modulated or unmodulated, and the frequency used for stimulation of the muscles is of interest. The frequency ranged from fifteen cycles per minute to fifteen cycles per second. Twenty muscles responded maximally to an unmodulated sinusoidal current ranging in frequency from fifteen to sixty cycles per minute. Thirty-three muscles responded maximally to a modulated sinusoidal current with a carrier frequency varying from five to fifteen cycles per second. The largest number—64 per cent—responded to a modulated sinusoidal current with a carrier frequency of five cycles per second. The modulation frequency was set so that the muscles contracted and relaxed at a rate of twenty-four per minute.

Twelve patients showed evidence of objective changes. Four patients gave no subjective evidence of improvement, but the remaining nine did. One patient showed neither objective nor subjective results and finally was discharged for operation to stabilize the ankle to counteract foot drop.

Early Group: The initial and final measurements of those parts measurable were recorded for the early group. Fifty-six measurements were recorded. Fifty-two areas were measured, and thirty-three or sixty per cent showed an increase. Two (or three per cent) showed no change, and twenty-one (or thirty-seven per cent) showed a decrease in circumference. Statistical analysis of the data shows that measurements for the lower leg only are significant. The initial measurements, however, were taken from seven to fourteen days after onset, so that atrophy at this early stage was not apparent. The maintenance of these muscles at their initial measurements over an average of fifteen months is good evidence that atrophy was effectively retarded. Those patients who lost the most weight as a rule showed the most atrophy.

It is unfortunate that we did not choose these patients so that they could have served as their own control. This would have eliminated the variables of sex, weight, age, homologous parts and growth.

The type and frequency of the current used for stimulation was slightly different for the "early group." There is not so wide a range of frequency used for this group as the late group. The lowest frequency used was a 60-cycle sinusoidal current for five muscles. The remainder of the patients required a modulated sinusoidal with a carrier frequency varying from three to fifteen cycles per second. The largest number of muscles—58 per cent—in this group responded maximally to a frequency of five cycles per second. The modulation frequency was maintained at twenty-four per minute.

All seven patients showed definite objective and subjective improvement, as would be expected during the first year.

Electromyograms were taken on all early patients and on those late patients who showed definite evidence of abnormality. Such evidences of abnormal innervation as prolonged stretch reflex—"spasticity"—and activity on the heterolateral side on either active or passive movement were considered. These phenomena in themselves are not specific for the anterior poliomyelitis muscle; however, the ease with which they occur and the extent to which they are found are characteristic of such muscle. It also is known that in the early phases of anterior poliomyelitis the variation in these phenomena is very considerable. Therefore the significance of the results on early patients is not as great as on the late patients. In later stages of anterior poliomyelitis this evidence of "spasticity" and abnormal innervation has in many cases largely disappeared. If, however, it is still present it usually remains constant for a longer period of time. In four of our late cases considerable evidence of abnormal innervation was still present.

Early Cases: Some evidence of abnormal innervation was found in all patients either expressed as "spasm" or as evidence of heterolateral activity. It had disappeared or considerably decreased in all instances after varying time intervals of from seven to eighteen months. The controls, however, showed a similar picture with the exception of one patient, where an increase in spasticity was found fifteen months after the first recording. In view of the variability of these phenomena in the early stages, we feel that no significant conclusions can be drawn from our present data. A larger number of cases in the early stages will have to be examined before conclusions can be reached.

Late Cases: In view of the fact that long lasting

spasticity and abnormal innervation tend to become constant over longer periods of time the data in this group have more significance.

One patient showed clear evidence of prolonged stretch reflex and heterolateral activity in the first recording. Recordings taken two months later showed hardly any evidence of heterolateral activity and only very minor evidence of prolonged stretch reflex. In records taken fourteen months later all evidence of abnormality has disappeared.

Another patient showed some evidence of heterolateral activity in his initial recordings which still was present in recordings taken one month later but had entirely disappeared after twelve months.

A third patient is particularly interesting because of the long interval between the onset of the disease and the onset of our observations. On the initial records there was definite evidence of heterolateral activity while records taken ten months later show a complete disappearance of these phenomena.

It may be concluded, therefore, that all our late patients show a definite decrease or complete disappearance of the phenomena associated with abnormal innervation (prolonged stretch reflex or "spasticity" and heterolateral activity) during the period of observation and treatment.

DISCUSSION

As a result of animal experiments, a great deal of evidence has been presented since 1939[1-9] proving that adequate electrical stimulation of the denervated muscle prevents a marked weight loss of the muscle and to a lesser degree a loss in muscle strength. It is now generally agreed that adequate treatment is essential to secure favorable results. Adequate treatment means: (1) vigorous contractions must be secured; (2) treatment must be given daily and each muscle stimulated two or three times with short intervals of rest between the periods of stimulation; (3) the muscle should be stimulated for ten minutes, or until fatigue occurs. Contrary to the usual clinical concept, there is absolutely no danger in stimulating a fatigued muscle, but, it is a waste of time because tension cannot be secured in a fatigued muscle; thus, the treatment would be ineffective; (4) use of the proper current form. Investigators are agreed that electrical stimulation must produce tension in the muscle under treatment to be effective. In stimulating animals under anesthesia and restraint, the current form can be ignored if the current intensity is increased enough to secure tension in the muscle under stimulation without regard to the sensory effects on the animal. Even under these unphysiologic conditions, the current form is important. When treating patients, one cannot ignore painful treatments. Patients will not tolerate treatment that is uncomfortable. Therefore, it is important to use a current which will produce the *maximum muscle contraction* and *tension* with the minimum current intensity. The current used for our patients produced just such an effect. We found no difficulty in securing a vigorous muscle contraction for even the youngest patient, a two-year-old child. Such vigorous contractions are not possible with the interrupted direct current because the patient could not tolerate the required current intensity. (5) Treatment should be started as early as conditions will permit. Jackson[10] and Gutman and Guttmann[11] have shown that the earlier treatment is started, the greater is its effect; and (6) the muscle should be made to contract against resistance. Eccles[7], Hines, Melville and Wehrmacher[8], and Kosman, Osborne and Ivy[2] have demonstrated that atrophy of the paralyzed muscle is much less when made to pull against a load.

What can be expected of electrically induced muscle contractions in the treatment of anterior poliomyelitis? Obviously nothing of permanent value for those muscles whose anterior horn cells have been destroyed, whether few, or many leading to an irreversible paralysis. In this situation all forms of physical therapy are just as hopeless. Unfortunately, methods are not available so that one can definitely differentiate between reversible and irreversible paralysis in the early stages of this disease. Physical therapy can be of value, however, for those muscles with either a total or partial paralysis when the paralysis is reversible.

As long as a muscle is unable to function voluntarily, it would seem logical to give exercise electrically since that has been found effective in reducing atrophy in the muscles of experimental animals. Recently Jackson[10] and Liu and Lewey[12] have reported a similar reduction of muscular atrophy in man. Jackson has given evidence that wasting occurred up to a period of 400 days, when it stopped, and concluded that treatment was of value during this period even in the absence of reinnervation. After reinnervation of a muscle, its "trophic state" will be restored spontaneously to a greater or lesser degree by voluntary impulses. Although there cannot be any doubt that in man active exercise by voluntary impulses is the best treatment for a recovering muscle, it must be remembered that at the time of motor recovery muscle atrophy still is very marked, and the power of voluntary or reflex movement is limited. Therefore, Gutman and Guttmann[11] believe it advisable to continue electrical exercise until motor recovery is satisfactory. It is most useful in augmenting active exercise in instances in which the patient cooperates poorly al-

though innervation of the muscle is taking place. Jackson[10] concluded that electrical stimulation appears to aid voluntary action of the muscle when given at the time of reinnervation. This suggests that electrical exercise of a muscle is beneficial to recovery in two ways: in preventing wasting and in assisting in reeducation.

The data secured on our patients show that atrophy was retarded. The patients designated as the "late group" had 45 measurements taken of the treated limb. Forty-one measurements increased from 0.3 to 4.7 cm. Four (or 9 per cent) showed no change. Six of the patients were adolescents—2 to 16 years of age—and so growth changes occurred, but in five of these children the increase of the treated limb exceeded the increase of the contralateral limb.

The patients designated as the "early group" had fifty-six areas measured. Thirty-three (or 60 per cent) showed increases ranging from 0.1 to 10.5 cm. Thirty-five (or 62 per cent) decreased in size from 0.1 to 4.7 cm. However, inasmuch as the initial measurements were taken seven to fourteen days after onset of the disease, the atrophy at such an early stage was not fully apparent. Then, too, those patients who lost the most weight showed the most atrophy.

A study of the manual muscle test shows that there was some improvement in the strength of the treated muscles for the late group.

The remainder of the affected muscles of this group, which were given the usual physical therapy treatment but no electrical stimulation, offer an interesting contrast. In this group there were only 3 per cent of the muscles with an initial grade of zero, and 97 per cent with a grade from trace to fair. At the final examination these percentages had not changed. On the other hand, those muscles receiving both physical therapy and electrical stimulation changed the zero grade from 44 to 25 per cent. Fifty-six per cent of the remaining muscles were graded from trace to fair, but at the final test there were 75 per cent of the muscles graded from trace to good, or a gain of 19 per cent. Forty-five per cent of the muscles increased from one to three grades while forty-six made no change. Eight per cent retrogressed one grade. Electrical stimulation, of course, may have had nothing to do with this gain, but it does not seem likely. Every patient in this late group with electrical stimulation, started from six months to six years after onset of "polio", had had the usual physical therapy from onset of the disease and had been discharged from the hospital. The true index of accomplishment is not to be found in these measurements of girth or manual muscle tests but rather in the objective and subjective findings.

Those patients who were given electrical stimulation as soon as the diagnosis of "polio" was made and designated as the "Early Group" show a similar gain. Thirty per cent of the muscles started with a grade of zero, and at the termination of treatment this had dropped to 24 per cent. The remainder of the muscles (or 70 per cent) had a grade of trace to fair, which changed to 76 per cent from trace to normal. Fifty-one per cent of these muscles increased from one to three grades while thirty-seven per cent remained stationary. Eight per cent made a recession of one grade and two per cent went back two grades. In view of the changes which occurred in the "Late Group", it may be that treatment was terminated too soon for these patients.

The stimulation was well tolerated by all patients and certainly did not prove harmful even when instituted during the first week of the disease.

Less tangible evidence is our impression that stimulation of the muscles was a distinct aid in helping the patient to gain a sense of the muscle action needed and this was an aid in the reeducation of the muscle when exercise was attempted. Stimulation of the proprioceptive receptors also may be a factor in reestablishing the pathway for motor impulses. Our electromyographic evidence seems to indicate, however, that a definite improvement in the innervation of available muscles and a return to normal innervation patterns has been obtained.

It is unfortunate that electrical stimulation of the muscles could not have been the only therapy used, but as previously stated, humane consideration would not permit this. All of the patients except one showed definite improvement—both early and late patients—and this might have been in spite of any treatment, or due entirely to the other physical measures used, but such is not our impression. It is our conviction, however, that daily vigorous muscle contractions obtained by an appropriate electrical current is of marked value during the period when the muscle is unable to function voluntarily so that atrophy can be retarded, especially during the period when atrophy occurs at the greatest rate—the first one hundred days (Jackson)—or even until one is sure that the paralysis is irreversible. This treatment combined with exercise therapy gives the best possible treatment for this disease that can be instituted. Certainly a great deal more work must be undertaken before the treatment of muscles by electrical stimulation can be fully evaluated.

SUMMARY

1. The muscles of twenty patients afflicted with anterior poliomyelitis were treated by means of electrical stimulation. Thirteen patients were treat-

ed late in the disease and seven were treated from onset.

2. Atrophy was retarded as the result of daily vigorous contractions produced electrically.

3. There was some improvement in the strength of the muscles stimulated.

4. Adequate treatment is described.

5. The maximum contraction and tension can be secured with a minimum current intensity when consideration is given to both current form and current frequency.

6. Treatment must start as soon as the diagnosis of anterior poliomyelitis is assured.

7. Children from two to sixteen years of age were given vigorous muscle contractions and tolerated the current well.

8. Electrical stimulation of the muscles was given for seven patients as soon as the diagnosis of anterior poliomyelitis was made. Thus treatment can be instituted during the acute phase of the disease without injury to the muscles or the patient.

9. A new type of generator was used in this study. The generator supplied a pure sinusoidal current which could be varied at will from two to six thousand cycles per minute.

10. There was some evidence, though less tangible, that stimulation of the muscles was a distinct aid in helping the patient to gain a sense of muscle action needed, and that this was an aid in the re-education of the muscle when active exercise was attempted.

11. Electromyographic evidence in the late cases seems to indicate that electrical stimulation may be of value in helping to restore normal innervation patterns of the involved muscles.

12. The rationale for the use of electrical currents in the stimulation of muscle is discussed.

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SUBSCRIPTION RATE AND CHANGE OF ADDRESS

Yearly subscriptions to THE PHYSICAL THERAPY REVIEW are now $6.00 in the United States; $6.75 outside the United States. Single copies 75c. Send your subscription to the AMERICAN PHYSICAL THERAPY ASSOCIATION, 1790 Broadway, New York 19, New York. Changes in address should also be sent to this office. Both the old and new address must be given.

Crutch Walking Device

In a Case of Bilateral Amputation With Single Prosthesis

Thelma Brown, R.N., R.P.T., and Clyde W. Phillips, M.D.

E. R., a 50 year old female patient, was admitted to the Medical Service of Provident Hospital March 24, 1948, with a diagnosis of uncontrolled diabetes mellitus.

The history of diabetes dates back to 1932. The patient had been controlled on insulin and diet. No difficulty was encountered until October 1946 when gangrene developed in the right leg subsequent to an ulcer of the great toe. A supracondylar amputation of the right extremity was done at another hospital November 9, 1946. An uneventful recovery ensued and ambulation was started with crutches.

Follow-up was done in our Diabetic Clinic at infrequent intervals until the time of her admission to the hospital in March 1948. At this time the left great toe was ulcerated on its dorsal aspect for an extent of about two and one-half by two centimeters.

Urinalysis

Sugar ..... Trace
Acetone ..... Negative

Blood Chemistry

Blood Sugar ..... 263 milligrams per cent

The patient was placed on medical management for the diabetes and after surgical consultation a left lumbar ganglionectomy (sympathetic) was advised as an attempt to improve circulation and preserve the limb. April 8, 1948, the second to the fourth lumbar ganglia of the sympathetic system were excised through a left flank incision. The ulcer did not respond to this procedure and gangrene progressively involved the entire left foot. Histamine flare test demonstrated adequate collateral circulation above the knee only. May 1, 1948, a supracondylar amputation of the left lower extremity was done. The stump was covered carefully with Ace elastic bandage in preparation for prosthesis fitting. Bilateral sinus formation at either end of the closure site of the stump somewhat complicated the healing process; however, rehabilitation was started in the Physical Therapy Department, May 3, 1948.

Figure 1.
Sketch of crutch device.

Physical Therapy

Orders: Coning of stump and crutch walking as early as patient can be taught. Patient to use right lower extremity prosthesis only, until subsequent examinations are made and further orders given.

Preliminary preparations for crutch walking were started on the second postoperative day. Bed reconditioning exercises were given to all remaining muscle groups in both lower extremities, with emphasis on muscles of the shoulder girdles and the lateral abdominals.

June 15, 1948, a prosthesis was fitted to the right lower extremity and balancing exercises were started.

The psychological and emotional preparation of this patient required very little time. The fear of walking with crutches was absent, the patient only needed assurance that it was possible to accomplish this with both legs amputated above the knees. Visual educational facilities demonstrating walking technics and devices of war veteran paraplegics and bilateral amputees

Departments of Physical Therapy and Surgery, Provident Hospital, 426 East 51st St., Chicago 15, Ill.

were employed in preparing the patient for her first lesson in balance.

Preparation of Left Crutch: A shelf 8 inches wide and 12 inches long, with a 25 degree forward tilt was attached with screws to the uprights. Two one-half inch wide steel bars were attached three and one-fourth inches from the shoulder piece and extended downward to be attached to the shelf. The shelf and the steel bar fitting in the groin were padded with cotton and covered with gauze.

Figure 2. Photograph of crutch device with pad in place.

The left stump, still draining, was allowed to rest on this shelf. The angle of tilt on the shelf tends to throw the center of gravity forward and thus aids the patient in keeping her balance. The steel bars prevent the stump from rolling off the shelf and hence adds to her security while standing.

Gait used.....Tripod Alternate Crutch Gait

Crutch gait: Right crutch, left crutch, drag prosthesis. The crutches are longer than standard measuring technics require, to maintain the three points of support necessary to provide equilibrium for this type of patient.

The patient took her first steps alone July 2, 1948. Rapid day-to-day progress followed and all muscle groups involved were strengthened without delay for complete healing of the ulcers which was realized about July 30, 1948.

A charitable agency provided one prosthesis for this indigent patient. Another prosthesis is promised by our Social Service Department but during the necessary waiting period for this to be achieved our inexpensive aid to walking has proved invaluable.

If the ulcerations were not present the crutch still would be of value because of its low cost and utility in a rehabilitation process of this type.

Figure 3.

SUMMARY

A case of a 50 year old female bilateral amputee is presented to illustrate methods employed for early ambulation after operation.

Because of the complication of draining sinuses in the most recently operated stump, a special crutch was devised whereby the stump could be utilized in walking without risking trauma or pain to the ulcerated regions. It was thought by the writers that early ambulation, without waiting for healing of the ulcers, was essential to a more successful muscle education and earlier rehabilitation of the patient. The patient learned rapidly by this method and since healing of the ulcers has occurred, she is now being fitted for prosthesis. The economic value of such a crutch walking device also is discussed.

Reservations

Make your reservation now for the 1949 Annual Conference of the American Physical Therapy Association. Use the reservation blank on page 52 of this issue.

SCHOOLS APPROVED FOR TRAINING PHYSICAL THERAPISTS

By Council on Medical Education and Hospitals of the American Medical Association

Name and Location of School	Medical Director	Technical Director	Entrance Requirements[a]	Length in Months	Classes Start	Tuition	Certificate, Degree, Diploma
CALIFORNIA							
Children's Hospital, Los Angeles	Samuel S. Mathews	Sarah S. Rogers	a-b-d	14	Sept	$300	Cert. or Degree
College of Medical Evangelists, Los Angeles[1]	F. B. Moor	R. Wm. Berdan	a-b-c-d	12	Sept	$225	Cert. or Degree
University of Southern California, Los Angeles	J. N. De Lamater	Charlotte W. Anderson	a-b-d[2]	12	Sept	$496	Cert. or Degree
University of California Medical School, San Francisco[1]	Lucile M. Eising	Margery Wagner	d-e	12	Sept	$220[4]	Cert. or Degree
Stanford University, Stanford[1] (Palo Alto)	Wm. Northway	Lucille Daniels	a-b-d[2]	12	Jan June	$523.30	Cert. or Degree
COLORADO							
University of Colorado Medical Center, Denver	Harold Dinken	Mary Lawrence	a-b-d	12	Sept	$300	Cert. or Degree
ILLINOIS							
Northwestern University Medical School, Chicago	John S. Coulter	Gertrude Beard	a-b-d	12	Oct	$450	Cert.
IOWA							
University of Iowa Medical School, Iowa City	W. D. Paul	Olive C. Farr	e	12	Sept	$200	Cert.
KANSAS							
University of Kansas School of Medicine, Kansas City	Donald L. Rose	Lilyan G. Warner & Ruth Monteith	a-b-c[3]	12	Feb Sept	$80[4]	Cert. or Degree
MASSACHUSETTS							
Louve-Boston School of Physical Education, Boston	Howard Moore	Constance K. Greene	H.S.	36	Sept	$500 yr.	Degree
Simmons College, Boston	Wm. T. Green / Arthur L. Watkins	Janet B. Merrill	a-b-d	16-36	Sept	$550	Cert. or Degree
Boston University College of Physical Education for Women: Sargent College, Cambridge 38	Kenneth Christophe	Adelaide McGarrett	H.S.	36	Sept	$435 yr.	Cert. or Degree
MINNESOTA							
University of Minnesota, Minneapolis[1]	Miland E. Knapp	Ruby M. Green	H.S.	36	Oct	$530[4]	Degree
Mayo Clinic, Rochester	Earl C. Elkins	Helen Belknap	a-b-c	12	Jan July	None	Cert.
MISSOURI							
Washington University School of Medicine, Barnes Hospital, St. Louis[1]	Sedgwick Mead	Beatrice F. Schulz	c	2 yrs	Sept	$400 yr.[5]	Degree
St. Louis University School of Nursing, St. Louis[1]	Alexander J. Kotkis	Sr. Mary Imelda	H.S.	36	Jan Sept	$300	Degree
NEW YORK							
Albany Hospital, Albany	John W. Ghormley	Catherine Graham	a-b-d	12	Sept	$250	Cert.
Columbia University, New York City[1]	Wm. B. Snow	Josephine L. Rathbone	a-b-c	1 or 2 yrs	Sept	$450 yr.	Cert. or Degree
New York University School of Education, New York City[1]	George G. Deaver	Elizabeth C. Addoms	a-b-d	12	Sept	$589	Cert or Degree
NORTH CAROLINA							
Duke University School of Medicine, Durham[1]	Lenox Baker	Helen Kaiser	a-b-d	15	Oct	$300	Cert.
PENNSYLVANIA							
D. T. Watson School of Physical Therapy, Leetsdale[1]	Jessie Wright	Kathryn Kelley	a-b-d	12	Oct	$300	Diploma
Graduate Hospital, University of Pennsylvania, Philadelphia[1]	George M. Piersol	Dorothy Baethke	a-b-e	12	Sept	$300	Cert.
TEXAS							
Hermann Hospital School of Physical Therapy, Houston	Oscar O. Selke, Jr.	Mary Elizabeth Kolb	a-b-d	12	Oct	$300	Cert. or Degree
University of Texas School of Medicine, Galveston	G. W. N. Eggers	Ruby Decker	a-b-d	12	Jan	$163[4]	Cert.
VIRGINIA							
Baruch Center of Physical Medicine of the Medical College of Virginia, Richmond[1]	Walter J. Lee	Susanne Hirt	a-b-c[3]	12	Sept	$351[4]	Cert. or Degree
WISCONSIN							
University of Wisconsin Medical School, Madison[1]	Harry D. Bouman	Margaret Kohli	a-b-c[3]	12	Sept	$120[4]	Cert. or Degree

[a]Courses are so arranged that any of the entrance requirements will qualify students for training. a = Graduation from accredited school of nursing; b = Graduation from accredited school of physical education; c = Two years of college with science courses; d = Three years of college with science courses; e = Four years of college; H.S. = High School graduation.

[1]Male students are admitted.

[2]High school graduates accepted for a four-year course leading to A.B. degree.

[3]High school graduates accepted for four-year college course.

[4]Nonresidents charged additional fee.

[5]Certificate granted by Children's Hospital Society; degree granted by University of California at Los Angeles.

[6]Tuition reduced second semester of second year.

Editorials

Student Membership

Student membership in the American Physical Therapy Association was established by the adoption of the by-laws at the national conference in 1948. Students in accredited schools of physical therapy are granted privileges of membership with the exception of the right to hold office and to vote. In order to keep the dues within the students' means they were set at minimum: five dollars, including a subscription to the REVIEW, or two dollars, without a subscription. One dollar of the student dues is allotted to the chapter.

Many chapters located in the areas near schools formerly invited students to their meetings as guests. Active membership should provide a much more satisfactory way of acquainting them with the purposes and accomplishments of their professional organization. The necessity of organization and concerted action in the achievement of professional goals is an accepted fact. We must be concerned with developing our future physical therapists into strong and active members—and we should help in educating them to be physical therapists who will continue the development of our profession.

We must begin by encouraging student membership and by welcoming them to our meetings. It is our privilege to give them an active place in the group and to provide them with the opportunity for participation. Although they may not hold office, they may serve on committees; they may take part in discussion; they may assist in countless ways. Chapters will be wise to take advantage of their enthusiasm and energy and will find their presence stimulating.

By welcoming the students as participating members and by helping them develop into useful, contributing members, we are insuring the future of our association and our profession. Each of us is indebted to the association which has so influenced our status. We should cooperate in using this opportunity for increasing the possibilities for future achievements.

Medical Legislation

Are you thinking of how actions of the 81st Congress will affect you as a physical therapist and as a citizen? Is the Program Committee of your local chapter planning a meeting in which the different plans may be interpreted, studied, and discussed? We feel that these are things of which you should be thinking.

You have, of course, read about the bills which have been presented and the administration program on health and welfare.

The National Health Insurance program, planned by the Federal Security Administrator Oscar Ewing, is the compulsory insurance plan which President Truman is endorsing.

The Voorhees Report of the Hoover Committee recommends the establishment of a single system of Federal hospitals under a National Bureau of Health.

Langer's Investigation of the Group Hospitalization Plan has thrown much light upon group hospitalization. We know that group hospitalization (demonstrated by the growth of the Blue Cross and Blue Shield and other plans) is increasing on a voluntary basis.

It will be to our advantage to avail ourselves of every opportunity for getting more information on any proposed and/or existing plan which affects the health of the people of our country. It would seem that in a democracy such as ours it would be preferable to educate for health insurance rather than to make it compulsory. In anything which will affect our total population we should proceed slowly, thoughtfully and carefully. Compulsory measures are necessary only in times of great stress and emergency.

If we would prefer the educational process, we should calm ourselves in the recognition that it probably will be rather slow. But, we can help to expedite matters if we inform ourselves. We can do this by reading our newspapers and magazines and then by giving our time and efforts towards planning and conducting intelligent discussion groups and by reporting to our lawmakers the thinking of the group.

Our professional pride and our interest in health measures should stimulate us towards a desire to be an effective part of our great democratic government.

Let's be on the alert!

—FLOY PINKERTON, Chairman,
Committee on Public Laws

Twenty-Sixth Annual Conference

of the American Physical Therapy Association

Copley Plaza Hotel, Boston, Massachusetts, June 19-24, 1949

Preliminary Program

	Sunday, June 19	*Monday, June 20*	*Tuesday, June 21*	*Wednesday, June 22*	*Thursday, June 23*	*Friday, June 24*
9-12		General Session—House of Delegates	The Neurological Basis for Treatment of Cerebral Palsy	The Neurological Basis for Treatment of Poliomyelitis	Research Papers	Clinical Demonstrations
12-2	Luncheon	Luncheon	Luncheon	Luncheon	Luncheon	Luncheon
2-4	Registration	The Neurological Basis for Treatment of the Hemiplegia	General Session—House of Delegates	The Neurological Basis for Treatment of Multiple Sclerosis	Physical Therapy and Arthritis	"Open House" at various physical therapy clinics in the Boston area
4-6	Exhibits	Exhibits	Exhibits	Exhibits	Exhibits	
7:30-9:00	General Session—Opening of the 26th Annual Conference Keynote Speaker: Dr. Howard Rusk	Motion Pictures and Slides	Banquet	General Session—House of Delegates	Concert Boston "Pops"	

Reservations

A reservation blank for your convenience is provided on page 52 of this issue. Be sure to get your reservation in early.

School Section

The School Section is planning a "brunch" on Sunday, June 19th—time to be announced later. The School Section meeting will be held on Saturday, June 25th.

Public Health Section

At the Annual Meeting of the House of Delegates a motion was made that there be a section composed of physical therapists in Public Health Agencies. A further request was made that a notice be inserted in the REVIEW to ascertain the interest in the section.

By public health agencies it is meant both voluntary and public agencies such as: Visiting Nurse or other home visiting agencies; state, county, or city health departments; state crippled children's services, etc.

In order to ascertain the interest in such a section it is requested that any member interested send a card to the National Office stating his interest in the organization of a section, his present employment and whether he is attending conference.

A luncheon meeting at Conference has been suggested to further discuss organization of the section, and plans for it must be made in advance. It is requested therefore that all cards be sent in by March 1, 1949.

Exhibits

Time has been set aside for viewing of exhibits. Extensive scientific and commercial exhibits are being shown.

Movie-Time at Conference

Time has again been set aside for showing motion pictures and slides which would be of interest to physical therapists. Any member or organization who has movies, slides or film strips to show at the Annual Conference may apply for inclusion in the program to Margaret A. Kohli, Program Chairman, 155 Service Memorial Institutes, University of Wisconsin, Madison, Wisconsin. All applications must be filed by April 1, 1949.

All applications should contain the following information:

1. Title and brief description of the subject matter covered.
2. Length of film and time needed to show it.
3. Size of film—8, 16, or 32 mm. Silent or sound. Black and white or colored.
4. Number of slides and time needed to show them.
5. Size of slides—2x2, or 3x4. Kodachrome or black and white.
6. Name of organization and individual responsible for material.

The Program Committee will select those films and slides which in their judgment will be of greatest interest to the audience and which will fit into the time allotted. Only films and slides thus selected will be shown.

Association Activities

Director Appointed

Louise Bailey was appointed as a director of the Association by the Executive Committee until the next meeting of the House of Delegates, when, according to the Bylaws, an election is held to fill Mr. Henshaw's unexpired term.

Miss Bailey, a graduate of Sargent College, Boston University and Harvard Medical School Physical Therapy, has been a member since 1937. She joined the staff of the National Society for Crippled Children and Adults, Inc., as Physical Therapy Consultant, Cerebral Palsy Division, in April 1948.

Association Committees — 1948-50

Finance

Paul Campbell, Chairman, Philadelphia, Pa.
Margaret Kohli, Madison, Wis.
Mary Deatherage, Akron, O.

Education

Dorothy Baethke, Chairman, Philadelphia, Pa.
Florence Linduff, Washington, D. C.
Beth Phillips, San Francisco, Calif.

Inter-Professional Relations

Lucy Blair, Chairman, New York, N. Y.
Clara Arrington, Washington, D. C.
Harriet Lee, Washington, D. C.

Public Relations

Lella Dwyer, Chairman, Boston, Mass.
Carolyn Bowen, Seattle, Wash.
Gladys Neff, Long Beach, Calif.

Public Laws

Floy Pinkerton, Chairman, New York, N. Y.
Marian Williams, Palo Alto, Calif.
R. Lewis Brown, Pittsburgh, Pa.

Publication

Louise Reinecke, Editor in Chief, Chicago, Ill.
Gertrude Beard, Associate Editor, Chicago, Ill.
Florence Bouzas, Associate Editor, Chicago, Ill.
Nancy Sehman, Associate Editor, Charleston, W. Va.

Program

Margaret Kohli, Chairman, Madison, Wis.
Dorothy Dean, Chicago, Ill.
Virginia Greenwood, Boston, Mass., for one year

Exhibits

Jeanette Johnson, Chairman, Malverne, L.I., N.Y.
Lilyann Warner, Lawrence, Kans.
Hazel Stephens, Warm Springs, Ga.

Nominations

Lucille Daniels, Chairman, Palo Alto, Calif.
Catherine Graham, Albany, N.Y.
Sarah Johnson, Kensington, Conn.
John Untereker, Louisville, Ky.
Elsie Kuraner, Denver, Colo.

Representative to the American Registry for Physical Therapy Technicians

Jessie L. Stevenson, Nashville, Tenn.

Representative to the American Association of Health, Physical Education and Recreation

Mabel Locke, Idaho

Representative for 3 years to the Advisory Committee on Maternal and Child Health and Crippled Children's Services (Children's Bureau)

Barbara White, New York, N.Y.

House of Delegates

A memo recently has been sent to the chapters by the Officers of the House of Delegates calling attention to the changes in the House as provided in the new Bylaws, Article VI. Instead of one delegate the chapter is entitled to one delegate plus one delegate for each twenty-five active or life members or major fraction thereof. Each delegate must be a member in good standing for the two years immediately preceeding.

Section 3 of Article VI, it was pointed out, states that if the total number of delegates to which the chapter is entitled will not attend conference, those who will attend may cast the total number of votes for the chapter if so authorized.

The House of Delegates officers also asked the chapters to be considering conference meeting places for 1950 and 1951. It has been established that plans must be made two years in advance. The House of Delegates in 1948 voted its preference for a country type conference for 1950. There are, however, many things which must be considered in selecting a meeting place.

1. There must be living quarters for at least 500.
2. It must be in a location accessible to travel accommodations.
3. It is desirable to be near an area where outside lecturers are available.

Other points to be thinking of in regard to type of conference are:

1. Is the relations value of meeting in an urban center greater than our own preference for a "country type conference"? (Greater publicity with increased recognition is given the Association both through the press and the opportunity of inviting members of allied groups —physicians, hospital administrators, occupational therapists, medical social workers, nurses, etc., to attend day meetings.)
2. Is the educational result of a city conference greater to members?
3. Is the financial saving of a city conference to the Association treasury worth considering? (More commercial exhibitors purchasing space, less expense in importing speakers.)

It is conceded that an occasional "country type" conference is of real value, but the advantage of cities must be recognized.

Executive Committee Platform

In the January issue of the REVIEW there was a brief summary of the semi-annual executive committee meeting held in New York, December 10-12, 1948. It mentioned that an executive committee platform was adopted.

It was felt that there should be some definite working program each biennium. Although the platform does not encompass all the activities of the Association it does represent factors of prime importance.

1. Improve public and professional relations for better understanding of physical therapy service in meeting patient and community needs.
2. Study of basic and graduate physical therapy education to provide more effective patient care.
3. Recruitment of physical therapy students to increase the number of physical therapists in the field.
4. Development of a policy for nonprofessional assistants in physical therapy departments.

Comments

1. Through our national and local committees on relations it is hoped to effect a greater understanding of physical therapy services. Effort will be directed first to other professional groups with whom the physical therapists work. It also is suggested that lay groups who support in whole or in part physical therapy services be included in a program of orientation and understanding.

2. There must be continuous review of basic and graduate education in order that physical therapists have the necessary knowledge and skills to meet current patient needs and to anticipate developments. This it was felt could be worked out with committees already established.

A. Joint Educational Committee consisting of members from the Education Committees of the American Congress of Physical Medicine, the American Occupational Therapy Association and the American Physical Therapy Association.

B. Joint Committee to Study the Examination of the American Registry of Physical Therapy Technicians composed of members of the American Physical Therapy Association and the Board of the American Registry of Physical Therapy Technicians.

C. School Section of the American Physical Therapy Association.

D. Committee on Education of the American Physical Therapy Association.

E. Educational Secretary in the National Office.

3. The shortage of physical therapists is well known. A recent survey of the approved schools showed that all schools did not have capacity enrollment. Many applications were received but a large number did not have sufficient preprofessional education. The need to publicize more widely prerequisite requirements is evident. A continuous and vigorous recruitment program is necessary by every chapter and every member if the needs of

their community or area are to be met. At present the number of new physical therapists each year is but slightly more than those going out of the field.

4. The need for nonprofessional assistants in a physical therapy department has long been recognized by the Association. The professional physical therapist must be freed of housekeeping and clerical duties to be able to give more and better patient care. The following statement of general policy was read and approved:

"Through careful selection followed by orientation, instruction and demonstration, attendants shall perform routine maintenance duties in the department and thus free the physical therapist for full-time attention to professional duties. The department must be kept in order, linens changed frequently, patients assisted in preparing for treatment or dressing, patients placed on treatment tables or aided in moving. Supplies and linens must be stored, charts must be secured and returned, and equipment kept clean and ready for use.

"With the existing shortage of qualified physical therapists, it is particularly important that attendants assist in performing certain other duties after they have been given definite instruction in such procedures and have been made thoroughly acquainted with the principles of ethical hospital conduct. They must be under the direct supervision of a qualified physical therapist at all times. These duties may involve assembling equipment and supplies for use, placing and removing apparatus, preparing hydrotherapy tanks, timing treatment, and similar routines which might apply to the particular needs of the individual situation but would not be extended to any type of patient instruction or actual use of apparatus."

A committee of five is to be appointed to study the effective use of nonprofessional assistants to make recommendations for a job write-up. The Executive Committee recognized that situations differ and that the use of nonprofessional assistants would vary.

Physical Therapy Recruitment

During the next few months most high schools and colleges throughout the country emphasize vocational counseling and many have "Career Days."

Does your local high school have the latest information on physical therapy? How many prospective students or their parents have talked to you about your profession? Here is your opportunity to help gain the objective of Plank No. 3 of the Executive Committee Platform. Many of the applicants, the approved schools report, are turned down because of inadequate *preprofessional education.* This can be corrected with your help. There is, in the National Office, printed informational material such as the Brochure, Physical Therapy a Service and a Career, and Suggestions for Prospective Students. A list of the approved schools appears regularly in the REVIEW.

Each chapter chairman on education has on file copies of all current informational material and many chapters are carrying out vocational guidance programs. What is your chapter doing? What are you doing?

In order to help you answer the questions of parents and students regarding necessary study, "Suggestions for Prospective Students" as it is sent out is presented. Additional copies may be obtained from the National Office.

PHYSICAL THERAPY
SUGGESTIONS FOR PROSPECTIVE STUDENTS

To be a fully qualified physical therapist you must attend and successfully complete a course of study approved by the Council on Medical Education and Hospitals of the American Medical Association. A list of approved schools is enclosed.* There are changes from time to time in this list as new schools are added and others discontinued. It is suggested that you write us later for a current list if you are not applying for admission to a physical therapy course in the near future.

Study the enclosed list of schools carefully as the courses and prerequisite requirements for each have individual differences.

The following suggestions are offered to assist you in planning your educational program.

I. *High School Students*—
If you are in high school or have just finished high school, it is suggested that you consider a school which offers a four-year program leading to a degree. Consult list. You must complete the high school program which will meet college entrance requirements.

II. *College or University Students*—
(a) If you are already enrolled in a college or university and plan to transfer to a school offering a four-year degree program in physical therapy write to the school of your choice for specific requirements of that school. Consult list. To be eligible for the degree, it will be necessary for you to meet the entrance requirements of that school, satisfy the undergraduate requirements (such as subject requirements in English, Foreign Languages, History, Social Sciences, etc., as well as the specified biological and physical sciences) and complete the professional physical therapy curriculum.

(b) If you are planning to enter or are already enrolled in a college or university not offering a physical therapy program and expect to enter a one-year or a two-year physical therapy course, write to the physical therapy school of your choice (consult list) for advice in planning your undergraduate course to meet the specific entrance requirements of that school.

*See list, page 71, this issue.

In general the science requirements and subjects which the college student should take are as follows:

For the one-year physical therapy course:

Prerequisites—Three or four years of accredited college study including a minimum of twenty-four hours of credit in pertinent biological (laboratory), physical and social sciences including a minimum of six hours in psychology.

Science subjects and suggested minimum credits:

Biology—Zoology (Laboratory) (Elementary human anatomy and physiology may be included)	8 to 10 Sem. Hrs.
Physics, Elementary, and/or Chemistry (Physics is strongly recommended as it is required by a number of the professional courses. Write to the school of your choice for the specific subject requirements for entrance).	6 to 8 Sem. Hrs.
Social Sciences (Including a minimum of 6 Sem. Hrs. in Psychology)	10 to 12 Sem. Hrs.

Other subjects strongly advised:

Psychology (Child)
Sociology
Physical Education (in addition to that usually required, group games, dancing, etc.)
Hygiene
Speech

For the two-year physical therapy course:

Prerequisites—two years or sixty semester hours of accredited college study including a *minimum* of ten hours of credit in the laboratory biological and physical sciences (a minimum of *six* hours in biological sciences and *four* in physical sciences is required) and *six* hours of credit in psychology.

Science subjects and suggested minimum credit:

Biology or Zoology (laboratory)	6 to 8 Sem. Hrs.
Physics, Elementary, and/or Chemistry	4 to 6 Sem. Hrs.
Psychology—General	6 to 8 Sem. Hrs.

Electives strongly advised:

Sociology
Physical Education—in addition to that required, group games, dancing, etc.
Hygiene
Speech

Your course of study must be well-balanced. Your faculty advisor will assist you in further planning as each university or college has established requirements for a baccalaureate degree. It is important that your scholastic record be good. It is the privilege of any school or university to select those candidates who in their opinion are best qualified for physical therapy.

Physical therapy demands that you not only be skilled in your profession but that you have other personal and cultural qualifications as well. You must be able to meet people easily, be sympathetic and understanding in your approach to patients and be able to express yourself clearly in speech and in writing. To be a physical therapist is a privilege, a responsibility and a challenge.

The American Physical Therapy Association will assist you further upon request during your preprofessional and professional course of study. Write to us for further information and guidance at any time. Address: American Physical Therapy Association, 1790 Broadway, New York 19, N. Y.

There are many professional opportunities for young people today. We are among many professions seeking additional recruits. Sell your profession to a prospective student. You know it and you know the need. Is your department functionally below capacity because of lack of personnel?

Recruit Recruit Recruit

Let us know what success you have and your suggestions for additional material.

* * * *

See list of available slides, exhibits and reprints in this issue.

Foreign Membership Applications

Members of the Australian Physiotherapy Association, Canadian Physiotherapy Association, Chartered Society of Physiotherapy and New Zealand Physiotherapy Association who expect to remain in the United States permanently are eligible to make application to the Executive Committee for membership in the American Physical Therapy Association.

Application forms and certain specified references must be on file in the National Office on blanks provided. An evaluation of the applicant's preprofessional education by the U. S. Office of Education also must be filed before the application is considered. Application fee is $5.00.

If the applicant desires and references are satisfactory, assistance will be given in locating suitable employment here. Employment acceptable to the Executive Committee for a period not to exceed two years must be completed before final action is taken. In addition references must be submitted from two physicians acquainted with applicant's work here, a member of the A.P.T.A. who has worked or has had professional contact with the applicant and the A.P.T.A. chapter in the area where she is working during the probationary period of employment. Active dues must be paid before full membership status is granted.

Application forms are available from the American Physical Therapy Association, 1790 Broadway, New York 19, New York.

Placement Service

There are many physical therapy positions on file with the placement service. These are in general and children's hospitals, state departments of public health and crippled children's services, federal and state hospitals, crippled children's schools, visiting nurses' associations, state societies for crippled children and phyicians' offices, rehabilitation centers and curative workshops.

Many carry administrative, supervisory and consultant responsibilities. Some are for newly established departments, others provide an opportunity for departmental reorganization and expansion of services. Salaries for these positions range from $3,000-$4,000.

The staff positions offer opportunities to gain experience in a wide variety of cases. Staff salaries range in general from $2,400-$3,000.

If you are not now working or are interested in making a change write Placement Service, American Physical Therapy Association, 1790 Broadway, New York 19, N. Y.

Procedures of A.P.T.A. Placement Service

Every effort is made to make placements mutually beneficial to both applicant and employer. Consideration is given to the applicant's qualifications and wishes as to type and location of position and to the requirements of the position.

When you apply for placement service an application form is sent to you. Necessary information is requested, i.e., names and addresses of references, type of position and section of the country you desire, educational background and your employment record.

Reference forms are then sent to the persons indicated. Referrals are not made until references are on file in the office.

Outlines of the positions are sent to you. You are asked to notify the office which positions interest you, and then your references with summaries of your education and experience are sent to the employers indicated.

Negotiations from then on are between you and the employer. We ask only that you notify the National Office when you have accepted a position so we may keep your file up-to-date and not cause you and the office staff unnecessary work with additional referrals.

If you are not interested in applying for any of the positions referred, notify us at once with your reasons and we will make every effort to locate a satisfactory position for you.

Lists of positions and lists of applicants are not sent out. It is impossible to keep either list current as both change so rapidly. Unnecessary correspondence which frequently is nonproductive is required and it makes for bad relations with the employer group. Also there is a wide variation in the types of positions and the interests and qualifications of the applicants.

Your placement record becomes part of your permanent membership file. If at some future date you want to reapply for placement service all you need do is notify the office and send the names of recent employers to whom we may write for references.

Educational Secretary Applications

Applications for the position of Educational Secretary in the National Office will be received by the Executive Committee. The position is open as of July 1, 1949.

Minimum Qualifications

1. Member of the American Physical Therapy Association for a minimum of five years. Participation in Association activities both at the chapter and national level.
2. Education: Graduation from an approved school of physical therapy. A baccalaureate degree is considered desirable.
3. Experience: Some experience in a teaching situation which may be academic or in clinical practice supervision.

The Executive Committee wishes to emphasize that personal qualifications as well as professional will be considered. The Educational Secretary directs the educational activities of the Association in accordance with the program outlined by the Committee. The position also requires executive ability, qualities of leadership, diplomacy, ability to speak and express oneself in writing. A candidate should be familiar with general education trends as well as those pertaining to physical therapy.

Salary $4,500.

Write to the National Office for an application blank. All applications must be filed by April 15th to be considered.

Exhibits

• There are two exhibits in the National Office which are available for loan to the chapters for showing at local or state meetings of allied organizations.

1. This exhibit (Figure 1) has been shown successfully at meetings of the American Hospital Association, American Medical Association, American Academy of Orthopedic Surgeons, International Poliomyelitis Conference and the 1948 American Physical Therapy Association Conference. The background is gray — terra cotta lettering and the pictures are in Kodacolor. It stands on its own packing box which has a blue velour cover. It is 8 feet long and requires 10 feet of back wall space. It is easy to assemble. Two people can put it up in about 10 minutes.

2. Consists of two posters showing bed exercises and functional activities, and a large wooden seal of the Association (Figure 2). The view box contains Kodachrome slides illustrating physical therapy

Figure 1.

education and examples of physical therapy procedures. The stand on which the view box is placed is the packing box in which it all fits. A blue velour cover is used to cover the box. The exhibit requires 8 feet of back wall space. Additional posters are to be made for side walls.

These exhibits may be obtained by writing to the National Office of the American Physical Therapy Association. The National Office will prepay the express charges for a chapter and the chapter is expected to prepay the express back to New York.

- *Available Sets of Kodachrome Slides—2 x 2.*
  1. Course Content—for vocational guidance talks to prospective students.
  2. Physical Therapy Procedures—for vocational guidance talks and for allied professional meetings.
  3. Underwater Therapy—the technics of underwater therapy are described. These slides were made at the Orthopedic Hospital, Los An-

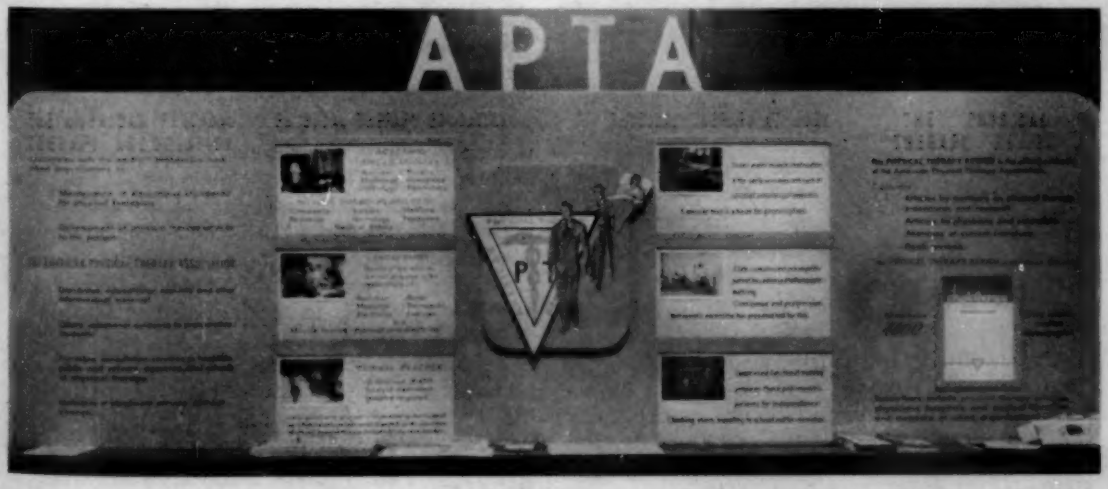

Figure 2.

Figure 3. Exhibit on Hemiplegia—presented by New York University Department of Rehabilitation and Physical Medicine and the American Physical Therapy Association at the Annual and Interim Sessions of the American Medical Association 1948.

geles, under the direction of Sue Roen and Charlotte Anderson. They are of interest primarily to physical therapists and physical therapy students.

4. Doctor Storms' series illustrating physical and occupational therapy at the Convalescent Center of the Workmen's Compensation Board, Malton, Ontario.

Special sets of slides will be made up from the above series upon request.

A script is enclosed with each set of slides.

The National Office will pay postage one way to chapters and to members.

Write to the National Office, American Physical Therapy Association, 1790 Broadway, New York 19, N. Y.

Membership News

Personals

• Dr. Donald Covalt spoke to a joint meeting of the physical and occupational therapists in Puerto Rico, December 1948.

• Clara Arrington recently returned to Washington, D. C., after an extensive field trip in the West. She attended chapter meetings in Washington and Oklahoma.

• Lucy Blair, Chairman on Interprofessional Relations and a member of the staff, Joint Orthopedic Nursing Advisory Service, will be in Denver and Boulder, Colorado, for the next three months. Miss Blair is participating in a program at the University of Colorado School of Nursing.

• Jessie Stevenson visited the National Office during the holidays. She is enthusiastic about her work at Vanderbilt University.

• Lorraine Frost, now an M.D., has an assistant residency in pediatrics at the Children's Hospital, Buffalo, N. Y.

• Lois Ransom, President of the Association, visited the Western New York Chapter in January.

• Lucille Daniels, Technical Director, Stanford University Physical Therapy School, visited schools and clinical centers in the East and in Canada in November and December.

• Florence Rahrig of Connecticut is now physical therapist at St. Mary's Hospital in Huntington, W. Va.

• Mrs. Winnie Lawson has given up physical therapy for full time housekeeping in Daytona Beach, Fla.

• Betty Runner Hackman recently announced the arrival of Albert Henry Hackman III, born October 5, 1948.

• Mary Clyde Singleton has been loaned by Duke Hospital to the North Carolina State Board of Health as Consultant in Physical Therapy. The task before her is one of organizing a program, the immediate problem being follow-up care of polio cases. She assumed her new position on November 15th and anticipated that it will last approximately six months.

• Helen Kaiser recently gave a series of lectures on "Body Mechanics" to nurses and public health instructors at the University of North Carolina.

• Betty Buell, Moultrie, Ga., a Sargent graduate, is now working at the Columbia Hospital in Columbia, S. C.

• Mary Allen is on leave from Baptist Hospital in Winston-Salem and is studying at Warm Springs. Alice Sheahan who is now at Oregon, also is studying at Warm Springs.

• Nancy Sehmann will give a talk on "Hemiplegias" and "Bed Care of the Orthopedic Patient" to the West Virginia State Nurses Association meeting to be held in February.

• Phil Riddleberger, Duke graduate of '43, is now doing State Cerebral Palsy work at Redwood City, Calif. The patients receive occupational therapy and physical therapy in teamwork along with the special schooling.

• The following physical therapists are now associated with the Charlotte Memorial Hospital Polio Unit: Nina Haugen, Mary Trufont, Florence Anderson, Patricia Ericson, Celia Craig, and Mrs. Ann Schreeder.

• New physical therapists at the Asheville Orthopedic Home in Asheville, N. C., are: Joye Siroky, St. Louis, Mo.; Betty Loeffler, Toledo, O.; Ethel Stagui, New Orleans, La.; and Florence Ward, Constableville, N. Y.

Joann Dyer, student member enrolled at the Children's Hospital School, Los Angeles, California, died after a short illness on December 9, 1948.

Marriages:

Helene Nagel of Tucson, Arizona, is now Mrs. Helene Kaplan.

Florence Rolph of Kansas City, Missouri, is now Mrs. M. G. Harrison.

Marjorie Dennen of Oakland, California, is now Mrs. Arthur L. Smith.

Julia Kassell of Brooklyn, New York, is now Mrs. Julia Lichtenstein.

Ruth First of Akron, Ohio, is now Mrs. Ruth Lowry.

Rafaela Quinones of Puerto Rico, is now Mrs. Rafaela Q. de Chardm.

Barbara Durant of Wellesley Hills, Massachusetts, is now Mrs. Barbara Hawkins.

Mary Margaret Scott of Laramie, Wyoming, is now Mrs. Margaret S. Filante and is attending the University of Minnesota Medical School.

Wilma Lange of Claremont, California, is now Mrs. Wilma Henke and has returned to school for further study.

Elva Braziell of Pittsburgh, Pennsylvania, is now Mrs. Elva Hively.

Dorothy Shriver of Kansas City, Missouri, is now Mrs. Dorothy Berg.

Marguerite Baldwin of Cambridge, Massachusetts, is now Mrs. Marguerite B. Houston.

Mary Ann Leque of Dallas, Texas, is now Mrs. Mary Ann Bass.

Rebecca McNees of Media, Pennsylvania, is now Mrs. Rebecca Osborn.

Helen Paull of Placentia, California, is now Mrs. Helen Haiber.

Dorothy Devendorf of Los Angeles, California, is now Mrs. Dorothy Thomas.

Joan C. Law of Piedmont, California, is now Mrs. L. Jerome Moore.

Ione Wells of Johnstown, Pennsylvania, is now Mrs. Ione Mathis.

Dorothy Lamar of Redwood City, California, is now Mrs. Dorothy Corr.

Mary Smith of Dayton, Ohio, is now Mrs. Mary Glaser.

Dorro Converse of Santa Paula, California, is now Mrs. F. Donald Sokol.

Hazel Strom of Port Huron, Michigan, is now Mrs. Hazel Bjorkquist.

Margaret Brummer of Los Angeles, California, is now Mrs. Margaret Scott.

June R. Archer, of Cleveland, Ohio, is now Mrs. Richard E. Bible.

Genevieve M. dela Torre of Los Angeles, is now Mrs. Genevieve Butts.

Shirley Softky of Minneapolis, Minnesota, is now Mrs. Shirley De Courcy.

Claire Fontaine of Fall River, Massachusetts, is now Mrs. Claire Cayer.

Patricia Bennett of Columbus, Ohio, is now Mrs. Patricia McKay.

Virginia Case of Saginaw, Michigan, is now Mrs. Virginia Wierda.

Sarah L. Braid of Long Beach, California, is now Mrs. Robert T. Rehtmeyer.

Rita Eaton of Utica, New York, is now Mrs. Rita Hess.

Elizabeth C. Coate of Rantoul, Illinois, is now Mrs. Elizabeth Hall.

Charlotte Curtis of Milford, Connecticut, is now

Mrs. Charlotte Eouzan,

Frances Dingley of Chicago, Illinois, is now Mrs. Frances Quigley.

Wyndham Martin of Tucson, Arizona, is now Mrs. Jackman Pyre.

Patience Dryden of Indianapolis, Indiana, is now Mrs. Alex E. Stom.

Cherryol Stranahan of Billings, Montana, is now Mrs. Cherryol Burrill.

Jennie Annis of Middleboro, Massachusetts, is now Mrs. Jennie Bissonnette.

Elvira Giannone of Paterson, New Jersey, is now Mrs. Elvira Morigerato.

Howard Curtis of Lincoln Park, Michigan, to Clara Whisant.

Doris Baker of Fort Worth, Texas, is now Mrs. Paul Patton.

School Notes:

Duke University: Since the physical therapy classes at Duke University overlap and there are two classes of physical therapy students around at the same time, the staff now refers to them as "juniors" and "seniors." The later graduated December 17, 1948. The "junior" class of twelve students entered on October 4th.

Chapter Activities

• *Carolina Chapter:* During a Fall business meeting of the Carolina Chapter, the members voted to divide the Carolina Chapter into North Carolina and South Carolina districts, each with its own chairman. It is anticipated that this move will facilitate matters of state legislation within each district.

• *New York Chapter:* The December meeting of the New York Chapter, Inc., was held in the Hospital for Special Surgery. Mrs. Glie H. Dervent, Division of Social Service, Hospital for Special Surgery, spoke on "Function of the Medical Social Worker in Relation to Physical Medicine."

New Members

• The following are newly accepted members of the American Physical Therapy Association:

Lucy R. Benjamin
Gloria M. Brawley
Betty Jane Clay
Evelyn A. Davies
Elsie-Eloise Hyde
Viola A. Jackson

• Recent graduates and former student members of the following schools:

Barnes Hospital:
Rosemary Kelly
Lois Stephens

Baruch Center of Physical Medicine of the Medical College of Virginia:
Arline C. Conrad
Ella Mae Vick

Mayo Clinic:
J. Nelson Mosher

New York University School of Education:
Arne Nicholaysen

Northwestern University Medical School:
Mildred W. Catchings

Stanford University:
Clara W. Kestner

University of Kansas School of Medicine:
Norma L. Conkle
Sara M. Schoppenhorst

University of Southern California:
Frances L. Hubbs
Betty Lee Kinsey

University of Texas School of Medicine:
John L. Byrne
Ellidee Dotson

University of Wisconsin:
Rayline Cairns

General News

• The Section of Physical Medicine of the University of Wisconsin Medical School, the Wisconsin Chapter of the American Physical Therapy Association and the Wisconsin Occupational Therapy Association will sponsor the second annual Physical and Occupational Therapy Symposium at the University of Wisconsin Medical School on April 2nd and 3rd, 1949. Details of the program will be announced in the near future.

Advance registration for physicians, physical and occupational therapists will be necessary. There will be no registration fee. For programs write to Dr. Harry D. Bouman, Professor of Physical Medicine, University of Wisconsin Medical School, Madison 6, Wisconsin.

• A postgraduate course in physical therapy and neuromuscular rehabilitation of three months' dura-

tion will be offered by the Kabat-Kaiser Institute beginning February 1, 1949. Registered physical therapists and graduates of accredited physical therapy training schools are eligible.

Tuition: $150.

Apply to: O. Leonard Huddleston, M.D., Ph.D., Medical Director, Physical Therapy Training School, Kabat-Kaiser Institute, Permanente Hospital, 2600 Alameda Street, Vallejo, California.

• Dr. A. Ray Dawson, assistant medical director for physical medicine rehabilitation, Veterans Administration, recently announced his resignation to return to Richmond, Va., as chief of physical medicine at the McGuire V. A. Hospital.

V. A. simultaneously announced the elevation of Doctor Dawson's assistant, Dr. A. B. C. Knudson, to chief of the reorganized physical medicine rehabilitation division, now under the direction of Dr. Roy Wolford, assistant medical director for professional services.

• Be sure to read, "Our Common Problem" by Basil O'Connor in the December issue of THE CRIPPLED CHILD. It is the text of a speech before the opening session of the Annual Convention of the National Society for Crippled Children and Disabled Adults, November 1948.

• A "Speech Correction Bibliography" has been compiled by the Library of the National Society for Crippled Children and Adults, Inc., 11 South La Salle Street, Chicago 3, Illinois, and may be obtained free of charge from the National Society.

• The 45th Annual Conference of the New York State Department of Health and the State Health Officers Association will be held in Lake Placid, N. Y., June 20-23, 1949. This meeting annually attracts the nation's leaders in the field of public health as speakers and participants. Last year's meeting took place late in July at Saratoga Springs and registration exceeded 1,500.

Index to Current Literature

Arthritis and Rheumatism

Management of the Rheumatoid Arthritic Patient. H. A. Burt. Physiotherapy, January 1949.

Cerebral Palsy

Therapy for Parents as well as the Cerebral Palsied Child (to be continued). M. E. Pusitz. Spastic Review, January 1949.

Therapy for Parents as well as the Cerebral Palsied Child (concluded). M. E. Pusitz. Spastic Review, February 1949.

Teaching the Cerebral Palsied to Chew. Elizabeth Bosley. Spastic Review, February 1949.

Diathermy

Treatment of Ophthalmic Herpes. Morris Cutner and Mary Stuttard. Physiotherapy, December 1948.

The Effect of Microwave Diathermy on the Peripheral Circulation and on Tissue Temperature in Man. Jerome W. Gersten, Khalil G. Wakim, J. F. Herrick and Frank H. Krusen. Arch. Phys. Med., January 1949.

Education

Visual Aids in Teaching. Greta James. Physiotherapy, January 1949.

Electrotherapy

Electric Stimulation of Denervated Muscle. Bernard Stoll. Arch. Phys. Med., January 1949.

Eye

Treatment of Ophthalmic Herpes. Morris Cutner and Mary Stuttard. Physiotherapy, December 1948.

Ophthalmic Treatments with the Galvanic Current. J. H. Stirling. Physiotherapy, December 1948.

Hydrotherapy

The Cutaneous Absorption of Radon from Naturally Carbonated Mineral Water and Plain Water Baths. Walter S. McClellan and Carl R. Comstock, Jr. Arch. Phys. Med., January 1949.

Nervous and Mental Diseases and Injuries

Physical Medicine and Psychiatry. Winfred Overholser. J.A.M.A., Dec. 25, 1948.

Peripheral Vascular Diseases

Methods of Improving the Peripheral Circulation. Nathaniel E. Reich. Medical Times, January 1949.

Rehabilitation

The Broadening Horizons of Rehabilitation and Physical Medicine. Howard A. Rusk. Arch. Phys. Med., January 1949.

Rehabilitation and General Practice. Howard A. Rusk. J.A.M.A., January 1, 1949.

Ultraviolet Radiations

Artificial Ultraviolet Irradiation as a Relative Protection Against Photosensitivity. J. L. Rudd. Arch. Phys. Med., January 1949.

REPRINTS AVAILABLE

One free copy of each scientific reprint (except the History of the American Physical Therapy Association, and the Anterior Poliomyelitis and Cerebral Palsy Issues of the REVIEW will be provided upon request to all members, students in the approved schools and libraries. A small charge is made as indicated for additional copies to members, students and libraries, and for all copies to nonmembers. The informational brochures are available to all without charge. To obtain reprints write: American Physical Therapy Association, 1790 Broadway, New York 19, N. Y.

PHYSICAL THERAPY, A SERVICE AND A CAREER
An illustrated brochure, describing the opportunities for a career in physical therapy, available scholarships and educational requirements for entering a school of physical therapy. (Made available through National Foundation for Infantile Paralysis funds.)

OUR ASSOCIATION
An informational booklet on the activities, scope and services of the American Physical Therapy Association.

PHYSICAL THERAPY
A question and answer article covering the usual queries received on physical therapy.

PHYSICAL THERAPY—*Suggestions for Prospective Students.*
Outlines the professional course of study for college students preparing for physical therapy.

PHYSICAL THERAPY SECTION: *Its Scope and Employment Opportunities.*
This consists of 12 articles by various contributors on physical therapy in a state crippled children's service, public health service, the cerebral palsy field, the Veterans Administration, the industrial clinic, a curative workshop, a large general hospital, a small general hospital, a children's hospital, crippled children's schools, the physician's office or clinic group and the psychiatric field.

ETHICS FOR THE PHYSICAL THERAPIST: *From the Point of View of the Medical Practitioner.*
HELEN HARDENBERGH, M.D.

APPROVED SCHOOLS OF PHYSICAL THERAPY
A list of schools approved by the Council on Medical Education and Hospitals of the American Medical Association.

EDUCATIONAL OPPORTUNITIES FOR PHYSICAL THERAPISTS.
A list of postgraduate programs offered by the approved schools and a list of specialized courses for physical therapists.

CARE OF PATIENTS WITH INFANTILE PARALYSIS: *Correlation in the Nursing and Physical Therapy Services.*
CARMELITA CALDERWOOD HEARST (5c)

POSTURE TRAINING FOR ADOLESCENTS
CAROLYN BOWEN (5c)

THE ORTHOPEDIC SURGEON AND CO-WORKERS IN THE TREATMENT OF POLIOMYELITIS.
C. L. LOWMAN, M.D. (5c)

THE PHYSICAL THERAPIST AND CO-WORKERS IN THE TREATMENT OF POLIOMYELITIS.
LUCILLE DANIELS (5c)

PHYSICAL THERAPY AND CHEST SURGERY
FLORENCE S. LINDUFF. (10c)

THE RESPIRATOR IN THE TREATMENT OF ACUTE POLIOMYELITIS.
DOROTHY GRAVES. (10c)

PHYSICAL THERAPY IN THE TREATMENT OF NEUROSURGICAL CONDITIONS: *With Special Reference to New Electrodiagnostic Measures.*
EDNA L. DILLON. (10c)

PHYSICAL THERAPY MANAGEMENT OF LOWER EXTREMITY AMPUTEES.
PAIGE WEAVER. (10c)

WALKING TRAINING OF THE AMPUTEE: *Some Biochemical Considerations.*
SIGNE BRUNNSTROM. (10c)

GUTHRIE-SMITH APPARATUS: *Its Construction and Use in Rehabilitation.*
KATHRYN S. BIER (20c)

THE PHYSICAL THERAPY REVIEW—*Special Anterior Poliomyelitis Issue.* July-August 1947 (75c)
The magazine contains 11 articles by leading physicians and physical therapists on research and treatment of polio. There are 16 abstracts of articles on polio from current medical journals.

A HISTORY OF THE AMERICAN PHYSICAL THERAPY ASSOCIATION.
IDA M. HAZENHYER. (50c)
An account of the Association's activities and growth from 1921-1946.

THE PHYSICAL THERAPY REVIEW—*Special Cerebral Palsy Issue.* May-June 1948 (75c)
This magazine contains 8 articles by leading physicians and physical therapists on research and treatment of cerebral palsy. There are 5 abstracts of articles on cerebral palsy from current medical journals.

Available free of charge from Joint Orthopedic Nursing Advisory Service, 1790 Broadway, New York 19, N. Y.:

MAKING PHYSICS A PART OF THE CURRICULUM: *Three methods of incorporating physics in the nursing school curriculum.*
HESSEL H. FLITTER, R.N.

Coming Meetings

Date	*Organization*	*Place*
May 18-21	Association for Physical and Mental Rehabilitation	Hotel New Yorker, New York, N. Y.
June 19-23	American Physical Therapy Association	Copley Plaza Hotel, Boston, Mass.
Aug. 23-27	American Occupational Therapy Association	Book-Cadillac Hotel, Detroit, Mich.

Abstracts

John S. Coulter, M.D.

Physical Medicine and Psychiatry, Some Interrelationships

Winifred Overholser, M.D., Washington, D.C. In JOURNAL OF THE AMERICAN MEDICAL ASSOCIATION, 138:17:1221, December 25, 1948.

The more recent work in the field of what has come to be rather cumbersomely termed "psychosomatic medicine" has done much to bring together the thinking of the psychiatrist and the physiatrist. Psychosomatic medicine is, strangely enough, not a new term. It was used in psychiatric literature in Germany over one hundred years ago.

More recently another type of treatment long used in psychiatry has been officially taken under the aegis of physical medicine, namely, occupational therapy. Occupational therapy, that is, the application of various types of occupation to the treatment of neurologic and psychiatric disorder, is a valuable adjunct to the application of physical means, such as heat, electricity and massage. Occupational therapy gives vent to the patient for his aggressions; it redirects his interest in topics outside himself and can be useful in developing skills and talents and in determining emotional and physical limitations and handicap levels.

Reassurance and encouragement may, of course, be overdone, but when they are properly administered they can be extremely useful for the patient's peace of mind and happiness. The confidence of the operator, his readiness to deal with situations as they come up and his general behavior are more important than words in giving a feeling of assurance and confidence to the patient.

In certain types of cases it is obvious that massage and other physical manipulations should be avoided on account of their erotic effect. This is especially true in patients with a pronounced homosexual component, for example.

The possibility that the symptoms complained of may be essentially psychogenic should never be overlooked. In an interesting study published recently by Watkins, Cobb, and others it was found in a series of 45 patients who complained primarily of fatigue that about 80 per cent of them were suffering from anxiety neurosis. There is a danger in such cases that overattention to the physical complaint may serve, so to speak, to fix it by directing attention to it and make it more difficult to deal with by psychotherapy. I do not mean by this that the physiatrist should try to make a psychiatrist of himself any more than the reverse should be the case.

The Care of Injuries to the Semilunar Cartilages of the Knee

Thomas P. Butcher, M.D., Emporia, Kans. In THE JOURNAL OF THE KANSAS MEDICAL SOCIETY, XLIX:12:511, December 1948.

The diagnosis of injury (usually tear and dislocation) of the semilunar cartilages of the knee and also the reason for operation upon these cartilages depend essentially upon one finding, and that is locking of the knee so that it cannot be fully extended.

Preparation for surgery may well include preoperative quadriceps exercises so as to expedite these after operation. A 24-hour sterile preparation is recommended.

Postoperative pain often is severe, but early quadriceps exercise is commenced the day after operation and weight bearing permitted in four to eight days. A splint or cast is not recommended. Simple foot weight-lifting with the patient seated on a desk or table is started within a week and increased as rapidly as tolerated until 40 to 60 pounds are being successfully lifted. The patient should, in four to six weeks, be able to lift several more pounds with the operated leg than with the good one.

The Care of Paraplegic Patients in General Hospitals

Eric Rogers, M.D., Ottawa, Ont. In THE CANADIAN MEDICAL ASSOCIATION JOURNAL, 59:4:338, October 1948.

Physical Therapy.—The aim of a physical therapist in a general hospital is to prevent contractures and muscular deterioration, particularly of the arm and upper trunk musculature. It is the physical therapist's responsibility to see that a foot board is constantly in place to prevent the pressure of bedding causing foot contractures. As soon as the patient's general condition permits, simple reconditioning exercises should be done under supervision twice daily. Gradually the schedule should be expanded to include rolling from side to side, resistance pulls against weights on pulleys, and trunk lifting by means of overhead bed bars. The active physical therapy department at the Ottawa Civic Hospital organized wheel chair and mat classes. However, if the general hospital patient is able to engage in these activities, he is ready for transfer to the paraplegic center.

Clinical Assessment of Peripheral Nerve Injuries: Tinel's Test

W. R. Henderson, M.D., Edin., F.R.C.S., Neurological Surgeon, General Infirmary, Leeds. In THE LANCET, 6534:-CCLV:801, November 20, 1948.

On the basis of Tinel's test, nerve injuries fall into four clinical groups. It is assumed in the following description that there has been sufficient time for fibers to grow at least several inches along the distal segment.

Group I: No Regeneration.—Tapping on the nerve lesion (pathological type 1) produces tingling which is mild during the first few weeks and then becomes stronger when the sprouting axons are more exposed inside the neuroma. (The reverse of this is seen in the almost complete disappearance of response at the suture line immediately after resection of a tender neuroma.)

Group II: Negligible Regeneration.—In many severe (mixed) lesions, which to the naked eye resemble those in group I, a few stray fibers succeed in passing the obstruction in a lesion-in-continuity, or in bridging a gap of several inches. The sensation from the neuroma is virtually as strong as in group I, but tingling can also be obtained from the distal segment, though it is weak.

Group III: Partial Regeneration.—These intermediate cases show a wide range of partial recovery, varying from slight to good. All three types of fiber damage may be present (and perhaps also fibers undamaged or originally affected by neurapraxia). There is likely to be a preponderance of type III (axonotmesis) after a slight injury, whereas more severe lesions contain only types I and II, as after suture.

Group IV: Complete Regeneration.—When all the fiber sheaths are intact, percussion of the dense wave of unmyelinated axon tips advancing simultaneously along the nerve produces as strong a sensation as the neuroma response does in groups I and II. There is a delay of one or two months before this advance is detectable, and then it progresses about 3 inches a month.

Nazi War Crimes of a Medical Nature: Some Conclusions

A. C. Ivy, M.D., Chicago. In JOURNAL OF THE AMERICAN MEDICAL ASSOCIATION, 139:3:131, January 15, 1949.

Though I had been in medicine for thirty years, I realized for the first time at the Nurnberg Trials, the full meaning and importance of the contributions of Hippocrates and his school to medicine and human welfare.

Hippocrates contributed the scientific philosophy of medicine as we know it today when he taught that disease is due to material causes and not to evil spirits, witches or the wrath of gods. He contributed a technical philosophy when he taught that diligence, accuracy, thoroughness in observation and skill were essential for success in the practice of a science and art of medicine. He apparently realized that a scientific and technical philosophy of medicine could not survive through the ages unless it was associated with a sound moral philosophy. One cannot conceive of a sound society with medicine that does not have a sound moral philosophy.

Medicine or medical ethics concurs in placing the emphasis on the individual. Simply stated, medical ethics, or the Oath of Hippocrates, is the Golden Rule of the profession. It states how one physician would like to be treated by another physician and pledges that such ethical treatment should be extended to the patient. For twenty-two centuries, or since the formulation of the Oath of Hippocrates, the principal concern of medicine has been "the welfare of the patient." Of course, the prime social reason for the existence of the profession is "the service it can render to humanity" by maintaining health and postponing death. But this social purpose, except for certain aspects of preventive medicine, can be achieved only by dealing with the individual. The physician is obviously the only person who can be morally and legally responsible to his patient, and conversely, the patient is morally and legally responsible to his physician. This physician-patient relationship can freely operate only where the free choice of a physician or clinic by the patient, and the free choice of a patient by the physician, except in an emergency, are unrestricted. Obviously a third party or agency cannot assume this confidential personal relationship and the moral responsibility involved.

Though a reverence for the life of the individual is the basic aspect, the doctor-patient relationship and the free choice of a physician represent the realistic aspects of the moral philosophy of medicine. It is important to realize that these and a few other aspects of the ethics of medicine have survived for twenty-two centuries, and the chief reason they have survived is the enduring realistic fact "that a sick person requires the care of a specially trained person and that the sick person must trust and have a reason to trust the specially trained person." It follows presumptively that as long as this personal relationship exists in the care of the sick, the same basic medical ethics are essential for the survival of the profession and the welfare of the sick.

Regardless of the relatively excellent and steadily improving health of our people and the leadership which American medicine holds in world medicine, a better distribution of expensive diagnostic and therapeutic facilities is needed. This need, I believe, is recognized by the majority of physicians and is acutely felt by many of our citizens at the present time. In meeting these needs the great progress made under the present system of medical practice must not be forgotten or underestimated. Any new proposal must be carefully scrutinized lest it lead to a deterioration of medical care. The profession should oppose any false remedy or temporizing proposal. It is the moral duty of the profession to do so.

Any new plan for medical care or any significant change in the existing plan of medical care must by all tests preserve inviolate a reverence for the life of the individual, the physician-patient relationship, the patient's free choice of a physician or clinic, the free enterprise system and the vesting in the profession of a major part of the responsibility for medical service and its financial reward. Unless this is done, I am convinced that the American public will have sold their medical birthright for a mess of pottage.

The Iliotibial Band: Its Role in Producing Deformity in Poliomyelitis

Charles E. Irwin, M.D., Georgia Warm Springs Foundation, Warm Springs, Ga. In JOURNAL OF BONE AND JOINT SURGERY, 31-A:1:141, January 1949.

The iliotibial band with its allied structures probably is the greatest deforming factor in lower-trunk and lower-extremity involvement following infantile paralysis. It has been said that this is a fact only in those cases which had had no care, or in which treatment had been inadequate during the acute and early convalescent stages. This is not always true. The author has seen these contractures appear and progress, in spite of the best conservative treatment available to the patient. The importance of these structures as a deforming factor has not been sufficiently emphasized since the original work of Yount.

Involvement of the muscles attached to this band is responsible for the increased tension under which it is placed during the acute and early convalescent stages of poliomyelitis. Spasm in the short head of the biceps and increased tension in the iliotibial band can be easily demonstrated by an attempt to extend the leg on the flexed thigh. Spasm in the gluteus maximus can be easily demonstrated by flexing the extended leg on the trunk. If the increased tension in the iliotibial band during the acute or early convalescent stage is not released by adequate conservative care, this tension becomes a progressive contracture.

Treatment indicated for the patient in the acute stage should be continued until the joints of the hip and the knee can be passively carried through their full range of motion in all directions without force, and without pain or discomfort to the patient. When this has been accomplished, the full length of the iliotibial band will have been preserved, and deformities due to its contracture will be less likely to occur.

A contracture, or shortening, of the iliotibial band cannot be corrected with conservative stretching and manipulation by the physical therapist; neither can it be overcome by the application of a series of plaster casts by the orthopedic surgeon. Surgical intervention is indicated, regardless of the age of the patient or the duration of the illness. It is impossible to lock the pelvis securely enough to allow a corrective force of any consequence to be exerted on the contracture. The anterior and lateral abdominal muscles on the side of the contracture are the muscles which will undergo stretching by these conservative measures. The pelvis simply will be forced into an oblique and hyperextended position.

Every severe and disabling deformity following poliomyelitis has an almost insignificant beginning. It is important to be thorough in examination, to recognize these early functional deviations, and to correct them before fixed deformities of paramount importance develop.

Treatment of the Fat and the Lean

Clifford F. Gastineau, M.D., Edward H. Rynearson, M.D., and Alice Karslake Irmisch, M.S., Rochester, Minn. In JOURNAL OF THE AMERICAN MEDICAL ASSOCIATION, 139:2:86, January 8, 1949.

The causes for undereating and overeating in the presence of an adequate supply of food are to some extent conjectural, but one can be certain that emotions, training and habit exert a considerable influence.

The treatment for both obesity and leanness is essentially the same: a diet and such psychotherapy as is necessary to

cause the patient to adhere to it.

Exercise has been demonstrated to be an inefficient means of disposing of an excessive intake of energy. Newburger has estimated that a patient must walk 36 miles (58 kilometers) to rid himself of 1 pound (0.5 Kg.) of adipose tissue. Exercises, massage and local applications of heat have no effect on local deposits of fat. Diuretics and heat therapy designed to increase perspiration may give both the physician and the patient a false sense of achievement by causing the excretion of a few pounds of water.

The only important adjuvant to diet in the correction of leanness is rest. Rest diminishes output of energy, allowing the increased intake of food to be retained in the form of body tissues. Rest also often may be employed to aid the tense anorexic patient to eat more freely.

Overweight is a serious menace because it appears to increase the incidence of many degenerative diseases. A reduction program is the most important weapon for combating such diseases. Underweight is reported to increase the susceptibility to tuberculosis but moderate underweight is a desirable state in the person past 40 years of age.

The cause of obesity and leanness is a disproportion between caloric intake and caloric requirement. The therapy of obesity or leanness consists of the correction of this disproportion by means of diet.

Administration of amphetamine in appropriate cases occasionally may be a useful adjuvant to dietotherapy, while psychotherapy often is of greatest importance in the case of underweight or overweight persons.

Diuretics, atropine, digitalis, desiccated thyroid and various endocrine preparations all accomplish little in reduction programs. Massage and exercises are ineffective in removing localized deposits of fat. Exercise is an inefficient means of disposing of excessive intake of energy. Insulin is impractical and vitamins ordinarily are ineffective in stimulating the appetite of lean persons.

The diagnostic terms "Simmonds' disease" and "Frohlich's syndrome" (adiposogenital dystrophy) have been widely used, but their use is rarely justified. Dercum's disease (adiposis dolorosa) has not been demonstrated to be an entity.

The Heating Effects of Microwaves With and Without Ischemia

Ralph E. Worden, M.D., Fellow in Physical Medicine, J. F. Herrick, Ph.D., Division of Experimental Medicine, Mayo Foundation, Khalil G. Wakim, M.D., Ph.D., Section on Physiology, and Frank H. Krusen, M.D., Section on Physical Medicine, Mayo Clinic, Rochester, Minn. In ARCHIVES OF PHYSICAL MEDICINE, XXIX:12; 751, December 1948.

Before and after exposure to microwaves, a comparative study was made of the temperatures of the skin, subcutaneous tissue, superficial muscle and deep muscle of the thigh of the dog with the circulation intact and after ischemia produced by clamping the abdominal aorta. Temperatures produced by exposure for five, ten, fifteen and twenty minutes were measured by means of a thermistor and thermocouples. The temperature rises in the ischemic tissues were slightly higher than in normal tissues but were not considered significant after five or ten minutes of exposure, nor was there any evidence of burning after exposure for these shorter periods. After fifteen to twenty minutes of exposure, the increased temperatures in ischemic tissues were considered significant, and out of 11 experiments made after exposure for these longer periods, gross evidence of burning was noted in 10. In several instances burning occurred at temperatures that were lower than those seen after exposure of tissues with intact circulation in which no burning occurred. Temperatures tolerated by normal tissues cannot be regarded as the safe range of tolerance for ischemic tissues.

Clinical Axioms in Physical Medicine

E. M. Smith and B. A. Strickland, Jr. In SOUTHERN MEDICAL JOURNAL, 41:844-847, September 1948.

The authors have attempted to formulate certain principles which have been found effective in the treatment of large numbers of patients in Army hospitals. Ten axioms are listed:

1. The application of a physical therapeutic measure can be expected to produce a certain result in a certain condition. As an example, the use of cold compresses in the early stages of a soft tissue trauma. It is applied to cause vasoconstriction, thereby reducing the tendency to hemorrhage.
2. The diagnosis being accurate, a physical therapeutic measure can be prescribed as specific for that condition. This is a plea for proper diagnosis to prevent the misuse of physical methods.
3. Beneficial results should not be expected in the use of a certain physical therapeutic measure, unless it be part of a complete regimen of functional restoration. An example of this is supracondylar fracture with the loss of motion following the cast removal. Heat, massage and exercise are all indicated, but heat alone will not suffice.
4. The physician must constantly keep in mind the contraindications of the various physical therapeutic measures. Hot moist packs would not be applied to a gangrenous toe in a patient with thromboangiitis obliterans.
5. A physical therapeutic measure should not necessarily be advocated as the sole curative measure, but rather as one of assistance. In injury to a peripheral nerve, muscle stimulation and reeducation are undoubtedly the major part of the treatment, but the neurosurgeon is to be consulted constantly with respect to the advisability of splinting, surgical intervention or other procedures.
6. The application of physical therapeutic measures is usually external and from its onset the physiological response is from without to within. Thus, it is possible to adjust dosage in a procedure such as fever therapy to the patient's tolerance. The extent and duration of the treatment can be accurately controlled.
7. The dosage of physical therapeutic measure must be subjected to the same careful analysis as with drugs. The condition of the patient, the precision of the modality, and the physiologic effect desired should be known before treatment is prescribed.
8. The advocating of a mechanical aid should not be the primary factor in a program of rehabilitation. Before instituting mechanical aids, the objectives should be to coordinate muscular function, increase muscle strength and as a result increase activity.
9. The physician in treating a patient with the use of a physical therapeutic measure must not think only of the condition he is treating but rather that he is treating that individual who has a condition requiring treatment. Even in a fracture, the patient is treated as well as the injured bone.
10. The injudicious or prolonged use of a physical therapeutic measure may aggravate or help set up a neurosis. As with all therapeutic procedures, excessive use may lead to a fixation.

Indications for Joint Manipulation

John Bastow, M.D., F.R.C.S. In PROCEEDINGS OF THE ROYAL SOCIETY OF MEDICINE, XLI:9:615, September 1948.

Once the diagnosis has been established, what type of case responds well to manipulation?

(1) The most successful cases are those following "minor trauma."

Here persistent pain, typically on movements in one or two specific directions and often accompanied by local tenderness and some swelling, which persists for weeks after a sprain or twist—and where a bony lesion has been excluded by X-ray and an inflammatory or neoplastic lesion by careful study of the case—is usually due to an adhesion which responds readily to manipulation under anesthesia.

Joints chiefly affected are: (a) The midtarsal and metatarsal joints of the foot; (b) the ankle; (c) the knee; (d) the lumbar region of the spine; (e) the cervical spine; (f) the shoulder; (g) the wrist.

Where the adhesion does not lie in the synovial membrane or capsular ligaments of a joint but in the attachment of a tendon or muscle, or between a tendon and its synovial sheath, manipulation without anesthesia is more effective, as the patient's involuntary resistance to the movement is essential to the success of the operation.

For example: (a) *"Tennis elbow,"* affecting origin of extensor tendons of forearm. (b) Tendon adhesions in the long head of the biceps or in the extensor tendons of the wrist. (c) Adhesions between the small muscles of the back.

In such cases, the tissues are otherwise normal and a normal range of movement may be expected to be obtained.

(2) *Postfibrositic stiffness*—either following an acute attack of fibrositis, which has subsided leaving some loss of function or persistent pain, or else as the sequel of long-continued chronic fibrositis. Usually the osteopath's spinal lesion is of this type—especially affecting the joints of the neck, the shoulders and the lumbar spine, and again a full range of movement may be obtained.

(3) In a similar category are the stiff neck following brachial neuritis and the stiff shoulder following adhesive pericapsulitis, but only when the acute stage has subsided.

Here it usually is wise to warn the patient that two or three serial manipulations may be required, and some temporary exacerbation of symptoms may follow each operation.

(4) In *osteo-arthritis* manipulation is of definite value, but great care must be taken to study the radiographs and attempt to regain only such a range of movement as the alteration in the contour of the articular surfaces and the contractures in the surrounding muscles and ligaments will allow.

Each manipulation must be followed by conscientious active exercises on the part of the patient, if any improvement gained by the movement is to be retained.

The deep hot pool bath with an attendant in the water to assist in the patient's movements is especially valuable in this condition.

Hips, shoulders, knees and spinal joints respond well on the whole.

(5) In *rheumatoid arthritis,* manipulation should never be employed in the acute stage with the idea of increasing movement of a joint. It may be used to correct flexion contracture if the joint is immediately immobilized by splintage in the corrected position, with the proviso that after twenty-four hours the splint is removed for a period daily to allow active movement and so prevent the development of ankylosis.

In the chronic stage, manipulation often is of value in increasing the range of movement of a stiff joint, but the radiograph must first be carefully studied to determine the amount of articular erosion that has taken place.

A full, normal range of movement can hardly ever be expected, and so manipulation must be guarded and no more force employed than the decalcified bones and fibrotic extra-articular tissues will stand.

Serial manipulations—only about 15 to 20 per cent increase in movement being attempted at each stage—are very useful in this condition. Joints that respond well are shoulders, cervical joints, knees and feet. Elbows do not respond well and should rarely be manipulated in rheumatoid arthritis.

(6) In *gout,* manipulation must never be performed in the acute stage, and should only be used under an umbrella of colchicine in the quiescent stage, for fear of an acute flare-up.

Serial movements, especially active assisted movements in the deep pool, usually are the safest to employ.

Electrical Tests of Sensation: Voltage-Duration Curves of Tactile Sensation and Pain

Donald L. Rose, M.D., Director, Department of Physical Medicine, University of Kansas Medical Center, Kansas City, Kans., and Sedgwick Mead, M.D., Director, Department of Physical Medicine, Barnes Hospital, St. Louis. In ARCHIVES OF PHYSICAL MEDICINE, 29:10:637, October 1948.

Experiments are described in which quantitative measurements of electrically produced tactile sensation and maximum tolerable pain were made.

Frequency distribution and voltage-duration curves using these end points were constructed and found to resemble closely similar determinations on motor nerves or nerve-muscle preparations.

Highly consistent results were found in individual experiments, but considerable variation was encountered in a single subject from day to day.

The reduction of a subjective sensation to the objectivity of a voltage-duration curve suggests this method to be worthy of further investigation.

Effect of Electrical Stimulation Upon Atrophy of Partially Denervated Skeletal Muscle of the Rat

A. J. Kosman, E. C. Wood and S. L. Osborne, Chicago, Ill. In THE AMERICAN JOURNAL OF PHYSIOLOGY, 154:3:451, September 1948.

Although considerable experimental data have been accumulated concerning the effects of electrical stimulation upon the atrophy of totally denervated skeletal muscle, there is no direct information of the behavior of partially denervated muscles toward such treatment. And yet, in its clinical applications, electrotherapy of paralyzed muscles involves muscles whose denervation often is incomplete. The present studies were undertaken to obtain such experimental evidence.

1. Electrical stimulation by means of a modulated sinusoidal current with a carrier frequency of 25 cycles per second significantly retards the weight and strength loss of the gastrocnemius muscle of the rat which occurs following partial as well as complete motor denervation.

2. The difference in weight and strength between treated and untreated muscles, which have been subjected to a partial denervation, become significantly greater as either the period of denervation or the extent of the denervation is increased.

3. The difference in strength (and presumably weight) between treated and untreated muscles is due to the effect of the electrical stimulation upon those fibers which have lost their innervation.

4. The tension developed by those fibers whose innervation is still intact is apparently unaffected by daily stimulation for periods of 14 to 28 days.

Temperature of Stomach and Gastric Acidity

M. Hochrein and D. J. Schleicher. In DEUTSCHE MEDIZINISCHE WOCHENSCHRIFT, 73:145, April 9, 1948. Abstracted in JOURNAL OF THE AMERICAN MEDICAL ASSOCIATION, 138:8:620, Oct. 23, 1948.

Hochrein and Schleicher describe a method by which they made continuous determinations of the temperature of the stomach. From the data obtained they deduced information about the gastric blood perfusion and at the same time they studied gastric acidity and some other circulatory factors. They found in persons with inadequate sympathetic nervous systems, who present symptoms of neurocirculatory dystonia, that the local application of cold to various sites of the body (feet, hands, abdomen) usually is followed by an increase in gastric acidity and by a decrease in gastric blood perfusion. Application of heat to abdomen, feet and other parts of the body effects by reflex action an improvement in the blood perfusion of the stomach and frequently a slight, short-lasting increase in gastric acidity.

Some Modern Aspects of the Treatment of Bulbar Poliomyelitis

H. D. Bouman, M.D., and K. B. McDonough, M.D., Madison. In THE WISCONSIN MEDICAL JOURNAL, 47:11:1099, November 1948.

It will be clear that in the patient with bulbar spinal poliomyelitis, the bulbar systems should dominate the therapeutic picture. Nobody will deny the importance of early physical therapy in spinal poliomyelitis. Insistence on the treatment of spastic or paralytic leg muscles when the patient's life is at stake can hardly be considered sound medical practice. This goes particularly for hot packing. Hot packing requires handling of the patient and sometimes produces postures which are not ideal for easy respiration. Use of hot packs may increase the oxygen requirements of the body, and if the patient suffers from hypoxia this would be undesirable.

Tube feedings should be avoided during the acute illness and should not be attempted until the temperature has remained normal for forty-eight to seventy-two hours and progression of paralysis has ceased. Earlier use of tube feedings is contraindicated because of the tendency of these patients to vomit.

When the patient is able to swallow his own saliva, sips of clear water and diluted fruit juices may be started. If no choking or regurgitation occurs, clear broth, apple sauce, jello, and junket may be gradually added. Milk is best avoided in the early stages of recovery because it tends to stick with mucus in the mouth and pharynx.

A word of caution should be said about the transportation of patients with evidence of bulbar paralysis. If such a step is necessary to obtain adequate treatment for the patient, he should be accompanied by a physician or nurse who has facilities available for the aspiration of mucus and the administration of oxygen. Such professional administration will help considerably to relieve the apprehension of the patient and perhaps save his life.

Rehabilitation in Industry

L. W. Plewes, M.A., M.D., Toronto, F.R.C.S.E., John N. Barron, M.B.N.Z., F.R.C.S.E., A. R. Thompson, M.D., Lond., D.P.H., D.I.H., H. H. Newell, Rehabilitation Supt., Vauxhall Motors Ltd., Luton, Beds. In THE LANCET, 6531:CCLV:699, October 30, 1948.

Industrial Occupational Therapy.—For the provision of remedial movements highly skilled operations are completely unnecessary. By far the most valuable machine-tool is the single-spindle drilling machine. By adding special equipment to the operating lever most movements can be obtained for hands, arms and shoulders. Other exercises for upper limbs are provided by the bending of copper and steel pipes around formers at the bench. Bending a ⅝ inch steel rod by pulling on a 5 foot bar gives an easy rowing motion which promotes development of the main trunk muscle groups.

Physical Therapy.—It is obvious that physical therapy is a necessary and important adjunct to an industrial project of this kind. Here there is a modern well-equipped unit employing a whole-time staff. It is situated close to the retraining shop, and this proximity suggests the importance attached to the close cooperation between them. From the physical therapy point of view it must be admitted that the ability to rely on long periods of controlled active exercise in the shop (42½ hours a week) is a great advantage. On the other hand, orthodox physical treatment is found necessary in 60 per cent of cases.

Mechanical Backache—The Most Common Type of Low Back Pain

George S. Phalen, M.D., Department of Orthopedics, Cleveland Clinic. In CLEVELAND CLINIC QUARTERLY, 15:3:113, July 1948.

Once the diagnosis of a "mechanical backache" has been established, the physician may assure his patient that the condition may be alleviated by certain simple measures. The patient should be urged to sleep on a firm bed. A piece of plywood between the mattress and springs is advisable, and a stiff cotton or felt mattress is better than an innerspring mattress. This firm bed prevents further strain to the back musculature.

Heat aids in the relaxation of the back muscles and stimulates circulation. The patient is advised to take a hot tub bath nightly, remaining in the water for a period of five to ten minutes. This should be followed by twenty to thirty minutes of heat application on the lower back, employing an infra-red lamp or a heating pad. A brief gentle massage applied to the patient's back is helpful, but not an essential part of the treatment. The patient then performs the series of exercises which have been prescribed by the physician and in which he or she has been carefully instructed.

Simple postural exercises will be found adequate for most cases of "mechanical backache." If possible, each exercise should be done five times at the onset and gradually increased over a period of several weeks or months to ten or fifteen times, depending upon the exercise tolerance of the individual patient.

A. Lie on back with knees bent:
   1. Tilt the pelvis, flattening the lower back against the floor.
   2. With pelvis tilted, raise the head and shoulders from the floor.
   3. With pelvis tilted, raise legs alternately.
   4. With pelvis tilted, straighten out one leg and then the other.

Electrodiagnosis in Peripheral Nerve Lesions

Sam D. Graham, Lieut. (j.g.) (MC) U.S.N.R. In U. S. NAVAL MEDICAL BULLETIN, 48:6:838, November-December 1948.

The newer electrodiagnosis machines, with their rectangular wave galvanic current giving accurate reproducible data, have become a great aid in diagnosing and following the course of degeneration, denervation and regeneration.

Many of Erb's original findings in his "reaction of degeneration" are still used in testing for nerve lesions, although his findings have been elaborated upon.

Certain characteristics for degeneration, denervation, and regeneration have been outlined and have been used to follow the state of innervation with good success.

Observations On Use of Respirator in Refractory Status Asthmaticus

M. F. Reiser and E. B. Ferris, Jr. In ANNALS OF INTERNAL MEDICINE, 29:1, July 1948. Abstracted in JOURNAL OF THE AMERICAN MEDICAL ASSOCIATION, 138:13:991, November 27, 1948.

Reiser and Ferris used anesthesia and the Drinker respirator for artificial respiration in 3 patients with acute intractable asthma. Since expiration is primarily limited in asthma, it would appear that the best procedure for the maintenance of adequate ventilation would be to support this phase. This can be effectively accomplished by the use of the Drinker respirator which applies positive pressure to the chest wall and abdomen. Since the respirator also aids inspiration, inspiratory dyspnea is at the same time decreased. In each of the 3 cases, prompt and satisfactory relief of anoxemia was accomplished and maintained until bronchiolar spasm had undergone remission. One patient was treated early in the course of his attack and recovered uneventfully. The 2 others died, but the unfavorable outcome can be explained on the basis of complicating factors and need not be regarded as indicating failure of treatment with the respirator. While no definite conclusion can be drawn from limited experience, it is felt that the rationale is sufficiently clear, and the results, so far as relief of anoxemia is concerned, are gratifying enough to warrant the use of the respirator in refractory status asthmaticus. It is of utmost importance that the therapy be instituted early in the course before irreversible changes have appeared or other grave complications have had time to gain foothold. This maneuver is not suggested as a substitute for other well established methods of treatment, but rather as an adjunct in refractory cases.

The Response of the Quadriceps Femoris to Progressive-Resistance Exercises in Poliomyelitic Patients

Thomas L. DeLorme, M.D., Robert S. Schwab, M.D., and Arthur L. Watkins, M.D., Boston, Mass. In THE JOURNAL OF BONE AND JOINT SURGERY, 30-A:4:834, October 1948.

The response of poliomyelitis-weakened muscles to progressive-resistance exercises has been studied in twenty-seven quadriceps femoris muscles. The effectiveness of these power exercises for increasing strength in normal muscles and in those atrophied as a result of immobilization prompted this study. The rationale for treatment was based upon the hypothesis that, in poliomyelitis, the remaining innervated muscle fibers are normal and therefore possess the same potentialities for hypertrophy and power as normal muscles. Thus the degree of the muscle's response to exercise should be directly proportional to the number of muscle fibers with intact nerve supply. Results clearly indicate that poliomyelitis-weakened muscles respond in much the same fashion as do normal muscles but to a degree proportionate to the number of remaining innervated muscle fibers.

Nineteen subjects participated in this investigation, eight male and eleven females. Eight had bilateral involvement, and therefore comprised sixteen of the twenty-seven quadriceps studied. The interval between the end of the acute stage of the disease and the initiation of exercise ranged from one to forty-nine years; therefore, changes in muscle function observed during the exercise period were probably due to exercise and not to spontaneous recovery. The ages of the participants ranged from eighteen to fifty years.

Originally, it was intended that all patients receive exercise for four months. However, in only fourteen of the twenty-seven quadriceps femoris muscles studied was the four-month period completed. Of the remaining thirteen in which the full course of exercise was not completed, ten were accounted for because of financial, occupational or transportation difficulties of the patients. In the other three, strength equal to that of the uninvolved extremity (as measured by strength tests) was attained before the end of the four-month period. All subjects in this investigation exercised once daily, four days a week. One-repetition maximum and ten-repetition maximum were determined once a week. Throughout the period of investigation the patients received no other remedial exercises, and they were instructed to continue daily activities as usual.

The power of normal muscles can be doubled in the first four to six weeks of exercise. Of the twenty-seven quadriceps muscles studied, fifteen doubled or more than doubled quadriceps power in the first month. The remaining twelve showed improvement, ranging from 1 per cent to 89 per cent. These results are believed to compare favorably with the response of normal muscles.

Accurate determinations of maximum potential muscle power by the methods described, or by any other method known to the authors, are impossible. Certainly all of the gains recorded in muscle strength cannot be accounted for by anatomical changes within the muscle itself. The element of learning plays an important part, even in the performance of extremely simple motor acts, and probably contributes in no small way to the increased ability to exert a maximum effort. At the time of initiation of exercise therapy the influence of learning is lowest; and strength measurements taken at this time often reveal considerably lower values than measurements taken a few days later. This rapid improvement in effective strength occurs before any gross changes in muscle volume are noticed and is due largely to motor learning. The patient's concept of maximum exertion and his willingness to endure the discomfort of maximum exertion may also account for rapid increases in effective strength. All factors considered, however, the strength measurements are indicative of the effective lifting power at that moment and under the existing conditions.

All except three muscles showed an over-all increase in work capacity.

The work capacity of eleven of the twenty-seven quadriceps muscles had at least doubled after one month of exercise. Fifteen of the twenty-seven doubled their maximum strength in one month. Of this fifteen, only eight were among those whose work capacity doubled in the same four-week period. Of the eleven whose work capacity doubled, eight were among those who had a twofold increase in power. None of the muscles showed a permanent reduction in power; however, slight increases in power were frequently accompanied by a great increase in work capacity and, conversely, large increments in muscle strength were occasionally accompanied by a decrease in work capacity. Such observations make imperative the individual consideration of data to obtain accurate information as to the functional changes in muscle activity.

It may be generally stated that the degree of improvement in power and work capacity was approximately the same for extremely weak muscles as for muscles with greater initial strength, and that the failure to reach normal functional capacity was due to the absence of a normal number of motor units.

The ergographic data are in keeping with functional improvement observed by the patients,—namely: (1) less difficulty in performances requiring strength, and (2) ability to perform for longer periods without fatigue.

The improvement reported most frequently by patients was the ability to perform ordinary activities with less effort and fatigue.

Three patients noted no improvement in functional ability as a result of exercise. They represented four of the quadriceps muscles studied, and had displayed no symptoms due to quadriceps weakness prior to exercise. Although these three had good quadriceps power before exercise, the

strength of the involved extremity was considerably less than normal.

The qualitative and quantitative evidence presented supports the hypothesis that, following acute anterior poliomyelitis, the remaining innervated muscles respond to progressive-resistance exercises by an increase in strength and work capacity in much the same manner as normal muscles.

The Care of Paraplegic Patients from the Viewpoint of Internal Medicine

H. Ivan Sippy, M.D., Consultant in Internal Medicine, Veterans Administration Hospital, Hines, Ill. In ARCHIVES OF PHYSICAL MEDICINE, 29:11:715, November 1948.

1. Unusual difficulties are encountered in the diagnosis of intercurrent illnesses among paraplegic patients because of their disturbed visceral sensation and motor function and their impaired muscular reaction to pain and palpation. The customary presence of other disorders, such as decubitus ulcers and urinary tract infections, makes for further confusion.

2. Treatment of intercurrent diseases is hampered by the same factors and, in some instances, by the mechanical limitations imposed by paraplegic disability.

3. Prevention of illnesses is furthered by the good state of nutrition which prevails in this group of patients. An extensive review of laboratory data shows that blood protein levels, erythrocyte counts and hemoglobin determinations compare favorably with the normal values.

4. Investigational studies directed toward clarification of some of the problems encountered by the internist are contemplated. In an effort to select suitable subject for such investigation, a survey of already recorded data is now in progress. From this survey it is becoming evident that gastric analysis, tests for visceral pain, orthostatic variations in blood pressure and gastrointestinal motility in paraplegic patients merit further study.

The Possibilities of Physical Medicine from the Standpoint of the Internist

George Morris Piersol, M.D., Philadelphia, Pa. In CHICAGO MEDICAL SOCIETY BULLETIN, 51:24:417, December 11, 1948.

The paraffin bath, in which the part is repeatedly immersed in or painted over by melted paraffin until a protective coating is established, is an excellent method of obtaining prolonged effects of a high surface temperature. It has been shown that skin temperature under such a coating of paraffin may be around 116 F. The paraffin bath affords an even distribution of heat, leaves the skin soft and pliable, relieves pain and swelling, and is particularly useful in arthritis of the hands and feet.

It has been our observation that diathermy has little to commend it in the management of arthritis. Indeed, when applied to acutely inflamed joints it brings about an increase in pain and disability.

The whirlpool bath is one of the most effective forms of treatment in the management of arthritis involving the extremities. The temperature of whirlpool baths usually is maintained between 100 and 110 F. Since the water is kept constantly aerated and in motion by mechanical agitation, the effect of gentle and continuous massage is added to that of heat.

Pemberton regards massage as the most valuable procedures in the treatment of arthritis. He believes that properly applied massage does good in chronic arthritis in four ways. (1) It helps to prevent or delay atrophy in muscles and aids in the restoration of muscle tissues when atrophy has already occurred. (2) It improves the general and local metabolism. (3) It increases the amount of circulation of blood to certain tissues and facilitates the return to the circulation of many corpuscular elements tucked away in inactive regions. (4) Lessens local edema by mechanically bringing about the effects normally exercised by muscles in aiding the heart to empty the venous circulation.

The importance of exercise in maintaining mobility of the joints in various cases of chronic arthritis has long been recognized.

A large part of the disability which occurs in patients with rheumatoid arthritis is the result of muscular atrophy, contractures and ankylosis of joints. This is largely preventable by the institution early in the disease of a suitable exercise program.

During the acute stage of rheumatoid arthritis or any joint disease a period of bed rest is essential, but this period should be as brief as possible. Even if the patient is confined to bed the value of exercise should not be overlooked. In addition to the use of heat and massage above referred to, patients should be taught muscle setting exercises which should be performed by the patient several times a day. Bed exercises of the uninvolved portions of the body should be carried out regularly every day so as to prevent general atrophy and the other ill effects of prolonged inactivity.

Bone Disturbances in Injuries to the Spinal Cord and Cauda Equina (Paraplegia): Their Prevention by Ambulation

Arthur S. Abramson, M.D., Bronx, N. Y. From the Veterans Administration Hospital, Bronx. In THE JOURNAL OF BONE AND JOINT SURGERY, 30-A:4:982, October 1948.

Certain bone disturbances occur with great frequency in injuries to the nerve contents of the vertebral canal. Some of these and their sequelae often are severe and crippling, and, on occasion, may even be capable of shortening the life span.

Of this group of bone disturbances, atrophy and soft-tissue ossifications are the most important, because of the disabilities they may produce, and because of the frequency of their occurrence.

Conclusions

1. Bone atrophy occurring in paraplegia is of an osteoporotic nature.

2. There is close association of urinary calculi and soft-tissue ossifications with the excessive calcium mobilization from the bones.

3. If calcium could be held in bone, urinary calculi, soft-tissue ossifications, and pathological fractures could be prevented.

4. Pressure produces bone matrix, thus allowing the deposition of calcium.

5. The only logical therapeutic agent which applies pressure intermittently is ambulation.

A Comparative Study of Short Wave and Microwave Diathermy on Blood Flow: The Role of the Somatic and Sympathetic Nerves in the Vascular Response to Deep Tissue Heating

Lawrence L. Siems, B.M., M.S., A. J. Kosman, Ph.D., and Stafford L. Osborne, M.S., Ph.D., Chicago. In ARCHIVES OF PHYSICAL MEDICINE, XXIX:12:759, December 1948.

1. Short wave and microwave diathermy are equally effective in increasing local blood flow in the hind extremity of the normal dog.

2. Loss of motor or sensory innervation to the part does not affect the essential nature of the vascular response to heating.

3. Evidence is presented suggesting that the integrity of the sympathetic outflow in the dog is necessary for the typical vascular response to local heating.

4. There is no evidence that any known method of heating possesses properties which have any specific effect on blood flow.

Some of the Forces Exerted in the Normal Human Gait

Irving Rehman, Ph.D., Paul R. Patek, Ph.D., and Margaret Gregson, Los Angeles. In ARCHIVES OF PHYSICAL MEDICINE, 29:11:698, November 1948.

The purpose of this paper is to present data now available in connection with our long term study of locomotion in normal and in pathologic conditions. These results comprise some of the basic data to be resolved in the final analysis and have sufficient interest in themselves to warrant their presentation at this time.

Some of the forces involved in locomotion as determined by force plate measurements have been resolved.

1. The peak vertical loading occurs at 22.5 and 72.5 per cent of the full stride and varies with the rate of locomotion.

2. The peak loading in the anteroposterior measurements corresponds with that of the vertical loading. The first peak load represents a posteriorly directed ground reaction to the forward motion of the foot. The second peak is a forward ground reaction to the posteriorly directed force of the foot.

3. The transverse load is balancing action on the part of the musculature to maintain a constant axis through the center of gravity of the body when only one foot contacts the ground. The recording of these transverse forces show individual variance; hence no generalized conclusion could be reached.

4. The torque loads correspond in time intervals in their peak loading to the vertical and anteroposterior loads. They provide the lateral or rotatory forces necessary to maintain the forward motion of the body in a straight line.

Psychosomatic Medicine: Problems in the General Hospital

John F. Williams, M.D., Richmond, Virginia. In SOUTHERN MEDICINE AND SURGERY, 110:10:302, October 1948.

The traditional training given in most of our medical schools and hospitals has failed to consider the treatment and nursing care of the patient with psychosomatic illness. Because of this it is difficult and often impossible to obtain in the general hospital the minimal care needed for these patients.

Early ambulation helps greatly to cut short the postoperative period and the hospital stay. In addition to its known physiological benefits it is of obvious psychological value. Any reasonable means of eliminating the need for the time-honored soapsuds enema and the perils of the bedpan and urinal will do much for the morale of any patient.

Apprehension is the product of our times. It is our responsibility to prevent additional psychological illness by our cooperative efforts.

The Chronic Invalid

Edward L. Bortz, M.D., President, American Medical Association, Cleveland. In JOURNAL OF THE AMERICAN MEDICAL ASSOCIATION, 138:10:745, Nov. 6, 1948.

The patient with chronic illness is one of the major challenges to modern society. Sooner or later some form of long term illness affects one or more members in most families of the nation. Approximately 2,000,000 of our population are chronic invalids at the present time, and the number is steadily increasing. It will increase still more as the control of other disorders which were so devastating heretofore is now being more effectively managed.

As more persons are living longer, there is more opportunity for chronic illness to develop. To this extent aging of the population may be regarded as a contributory factory. However, it should be kept in mind that aging and chronic invalidism are not synonymous by any means. The misconception that old age is constantly visited by chronic invalidism must be dispelled. Many persons now have a vigorous and enjoyable senectitude free of prolonged illness.

Long term illness produces an added burden on the patient's family. It adds one more problem case to the social agencies who exist for the purpose of neutralizing adverse social influences. If the invalid is the wage earner, the family's economic predicament becomes immediately acute, and economic dependency on society may result.

Medicine has much to offer a world which is suffering from insecurity and which longs for peace of mind. A more vigorous and a more healthy population, steadily waging a successful battle for the control of the devastating diseases which afflict our fellow men, should be well equipped to study ways and means for bringing about a more stable social order.

Early Ambulation in Surgical Convalescence

Nathaniel Glickman, M.S., Robert W. Keeton, M.D., Warren H. Cole, M.D., Nathaniel O. Calloway, M.D., et al, Chicago. In ARCHIVES OF PHYSICAL MEDICINE, XXIX:12: 770, December 1948.

Early ambulation did not decrease the observed impairment of the liver, except in one comparison.

A negative nitrogen balance occurred in patients convalescing from herniorrhaphy and fed submaintenance calories during the first few postoperative days. The extent of this negative nitrogen balance was reduced by instituting a program of early ambulation.

A positive nitrogen balance was maintained in patients convalescing from herniorrhaphy and tube fed a diet high in protein. The extent of this positive balance was increased by instituting a program of early ambulation.

It was shown that the nitrogen intake of the compared groups was the same preoperatively and postoperatively and that the favorable effect of early ambulation on the nitrogen balance was due to a decreased nitrogen excretion during the postoperative period in the ambulated groups.

Early ambulation reduced the postoperative weight loss.

A stair-climbing test revealed no definite impairment in circulatory efficiency when applied to three groups of patients on the second and third postoperative days.

Only the 3 older patients showed a significant impairment of the cardiovascular system as measured by the step-up test. This occurred on the eleventh postoperative day and disappeared on the twelfth day.

The results of the flarimeter test were suggestive, indicating that a more detailed study is required.

Rehabilitation in Rheumatoid Arthritis

Stafford L. Osborne, Ph.D. In QUARTERLY BULLETIN, NORTHWESTERN UNIVERSITY MEDICAL SCHOOL, Chicago, 22:4:340, Winter Quarter, 1948.

Physical therapy is one of the most important single factors in the treatment of chronic rheumatoid arthritis. Nevertheless, it should not be forgotten that physical therapy is merely an adjunct to other treatment. Used without discrimination, physical therapy may cause harm. Physical therapy alone does not cure arthritis, and used to the exclusion of other antiarthritic measures, will not produce maximal results. The role of physical therapy is an essential one in the treatment of all joint conditions, and the care with which this form of treatment is planned may determine the time element in the progress of these difficult cases. Supervision of the patient by a physician well-trained in the treatment of rheumatoid arthritis is a first essential to gain the desired therapeutic results. His expert guidance is necessary to maintain the proper balance between rest and activity. The protection, expert instruction and the grading of treatment by the physical therapist under the physician's direction, can and does shorten the period of illness. It may be the important factor in recovery.

Dangers of Local External Heat and Trauma to Ischemic Tissues in Peripheral Vascular Diseases

Roy J. Popkin, M.D., Los Angeles. In CALIFORNIA MEDICINE, 69:5:374, November 1948.

Every textbook discussing peripheral vascular diseases mentions the possibility of gangrene, burns or ulcer formation following the application of what normally would be considered safe and therapeutic amounts of heat.

Ischemic tissues tolerate the local application of heat poorly. The basic principles are physiological and mechanical. These principles are:

1. Heat accumulates more quickly in ischemic tissues. The local heat regulatory mechanism cannot function properly. The normal physiological response to a rise in the environmental temperature of an extremity is an increased blood flow. On the application of external heat the vessels dilate, resulting in an increased flow of fresh blood which carries the heat away. Ordinarily this increased flow carries the locally heated blood to other parts of the body, chiefly to the surface, where the mechanism of radiation and increased perspiration cool it to normal. In the patient with arterial occlusion the increased blood flow is restricted. As a result the heat quickly accumulates in the tissues to dangerous levels.

2. External heat increases the metabolic activity of the cells. More oxygen is required and more waste products are formed. As a result, an increased blood flow is required. This increased demand cannot be met. The cells suffer acutely from the inability of the stenosed or occluded vessels to permit an increased blood flow required by a rise in local environmental temperature. Gangrene frequently supervenes.

3. Ischemic tissues lose their ability to discriminate between dangerous and safe degrees of heat. Nerve structures are very sensitive to a reduction in blood flow. Degenerative changes occur early. The receptor organs for warmth lose their efficiency. A much greater degree of heat is required to stimulate these end organs than would normally be necessary. It is possible for the individual to apply burning degrees of heat to an ischemic extremity without being aware of it.

Oximetry in Physical Medicine

Glenn Gullickson, Jr., M.D., and Allan Hemingway, Ph.D., Minneapolis. In ARCHIVES OF PHYSICAL MEDICINE, 29:10: 632, October 1948.

An instrument for determining arterial oxygen saturation is described with a brief review of the physics involved, the electrical circuit used and the method of operation. A few clinical applications for its use are presented.

Book Reviews

Polio and Its Problems. *By Roland H. Berg. With a Foreword by Basil O'Connor, President, The National Foundation for Infantile Paralysis, Inc. Cloth. Price, $3. Pp. 174, with 24 illustrations. J. B. Lippincott Company, East Washington Square, Philadelphia 5, 1948.*

This book gives the dramatic cavalcade of tireless research, perilous experiment and stern persistence as science answers the challenge of poliomyelitis. Medical research becomes a living thing as Roland Berg weaves the triumphs and disappointments of research scientists into a vivid and absorbing tale.

This book should be read by physical therapists. In the chapter "Mysterious and Controversial" Dr. Robert L. Bennett, Director of Physical Medicine at the Georgia Warm Springs Foundation says: "These seven steps are integrated in the over-all care which has as its ultimate goal complete rehabilitation."

The author here gives the importance of hospitalization for all cases of poliomyelitis so that, when required, they may have immediate modern treatment to minimize possible crippling after-effects. It emphasizes the need for help by family and friends, to produce harmonious social adjustment of the physically injured patient throughout life. It should be recommended to the patients, their family and friends to find answers to their questions about research and the advances which have been accomplished to date.

Muscles: Testing and Function. *By Henry O. Kendall and Florence P. Kendall, Physical Therapy Department, Children's Hospital School, Baltimore, Maryland. With a foreword by George E. Bennett, M.D., Emeritus Adjunct Professor of Orthopedic Surgery, and Robert W. Johnson, M.D., Adjunct Professor of Orthopedic Surgery, Johns Hopkins Medical School, Baltimore, Maryland. Cloth. Price, $7.50. Pp. 278, with 162 illustrations. The Williams & Wilkins Company, Mt. Royal and Guilford Aves., Baltimore, 1949.*

This book contains a comprehensive and detailed description of procedures involved in testing, grading, and recording muscle strength, and a discussion of the functional significance of muscle weakness and contracture.

The authors, during twenty-five years of experience in physical therapy, have done detailed muscle testing on several thousand patients, both paralytic and nonparalytic. In addition, they have done muscle tests and postural examinations on approximately one thousand so-called normal individuals of various age groups for the purpose of research. Theories and systems of procedures are presented clearly and graphically in the light of their experience and study.

The first chapter deals with general procedures and fundamental principles in manual muscle testing, including definitions of terms used, a thorough discussion of grading, including the use of the word "normal" in relation to muscle testing.

Four types of charts used in recording muscle examination are illustrated in chapter two: Diagnostic charts for Nerve Lesions, Cranial Nerve chart, Poliomyelitis charts, and Body Mechanics chart. Of these four, the first merits special attention. It is comprehensive and thoroughly done. The abdominal and respiratory sheets of the poliomyelitis charts are practical and simple to use yet give complete information.

The remainder of the book deals with specific tests and is extensively illustrated. It contains excellent photographs with a few correlated line drawings, illustrating the test for each muscle—showing the muscle, the direction of movement, and indicating the place and direction of the examiners pressure. The text adequately, yet briefly, gives pertinent information on the test. The section on trunk muscles is a revision of material contained in the U. S. Public Health Bulletin No. 242 (written by the authors April 1938). It very thoroughly covers the subject. Of special interest is the section on neck, facial, throat and respiratory muscles — very well illustrated.

The appendix contains origins and insertions of muscles grouped according to joint action.

The book's excellent organization of material and graphic illustrations recommend it as an invaluable aid in teaching. Physical therapists will find the book a practical and useful reference.

Brain and Intelligence: A Quantitative Study of the Frontal Lobes. *By Ward C. Halstead, Professor of Experimental Psychology in the Division of Psychiatry of the University of Chicago Department of Medicine, Chicago, Illinois. Cloth. Price, $6. Pp. 206. The University of Chicago Press, 5750 Ellis Avenue, Chicago 37, Illinois, 1948.*

The author, who is a psychologist, presents in this monograph the essence of his work carried on over a twelve year period at the University of Chicago during the tenure of a National Research Council Fellowship.

He devotes several chapters to an analysis of the various conventional concepts of intelligence and their means of measurement. Their inadequacies are discussed. He then develops his idea of "biological intelligence" which is defined in terms of four basic factors. (1) A central integrative field factor C which represents the organized experience of the individual against which new experiences are tested. (2) A factor of abstraction A which involves the comprehension of essential similarities and differences. (3) A power factor P which serves to regulate affective forces. (4) A directional factor D which constitutes the medium through which the other process factors are exteriorized. The methods of measuring those factors are described and statistically analyzed to form an impairment index.

The author presents some highly interesting information from his studies. Damage to the frontal lobes produces high impairment-index scores in contrast to damage to other lobes. Subcortical lesions of the frontal lobes, as in lobotomies, do not disturb the functions reflected by the impairment-index. Damage from cerebral anoxis may produce impairment and recovery of biological intelligence at a stage at which psychometric intelligence is unimpaired. His conception of the localization of the function of biological intelligence is interesting. "While it is represented throughout the cerebral cortex, its representation is not equal throughout. It is distributed in a gradient with its maximal representation occurring in the cortex of the frontal lobes."

Although the conclusions presented are quite understandable the means of arriving at them will tax the patience and ingenuity of all but the most avid student who has considerable background in experimental psychology. In these days of psychosurgery such careful means of study are extremely important and psychiatry is indebted to the author for his efforts in elaborating the concept of biological intelligence and its measurement.

An Introduction to Physics in Nursing. *By Hessel Howard Flitter, R.N., M.A., Head of Nursing Science Department, School of Nursing, University of Pennsylvania, Philadelphia; Instructor in Education, Hunter College of the City of New York, New York City; formerly Instructor of Physics Applied to Nursing, New York University, School of Education, New York City. Paper. Price, $3.25. Pp. 179, with 100 illustrations. The C. V. Mosby Company, 3207 Washington Blvd., St. Louis 3, Mo., 1948.*

Since in such a brief manual it would be impossible to consider thoroughly all aspects of the broad science of physics, the author has placed emphasis on those physical principles which are most practical for nurses. Some consideration of measurements and common units of measurement is necessary to give the student a perspective of physical measurements used in nursing. The study of physical forces is directly applicable to the care of the patient in traction. An understanding of body mechanics and crutch walking necessitates an understanding of such physical phenomena as motion and center of gravity. Since many nursing procedures, much equipment used in nursing, and many of the physiological processes of the body are based upon molecular movement, relatively greater space is devoted to the discussion of adhesion, cohesion, capillarity, absorption, adsorption, surface tension, viscosity, osmosis and elasticity.

An understanding of Archimedes' principle or the law of buoyancy is basic for the understanding of the principle of underwater exercise. The nurse's activities and the action of the mechanical equipment which she uses illustrate such concepts as work, energy and power. Since so great a number of nursing procedures are governed by physical laws that apply to heat, friction and pressure, a proportionately larger portion of this manual is devoted to a discussion of these topics. A better understanding of normal and abnormal sensation of light and sound therapies and of therapies with ultraviolet, infra-red and x-ray radiations will be possible when the student is aware of the wave phenomenon involved.

Some of the principles of the laws of physics contained in this volume will be helpful in teaching physical therapy.

Neuroanatomy. *By Fred A. Mettler, A.M., M.D., Ph.D., Associate Professor of Anatomy, College of Physicians and Surgeons, Columbia University, New York. Second edition. Cloth. Price, $10. Pp. 536, with 357 illustrations. C. V. Mosby Co., 3207 Washington Blvd., St. Louis 3, 1948.*

This is the second edition of Doctor Mettler's textbook of neuroanatomy. While this textbook is not intended primarily for students of physical therapy, nevertheless, on account of its many excellent features, it provides a desirable supplementary reference work for such students. The chapters on the gross anatomy of the brain, and especially the accompanying illustrations, will be of particular value to schools where gross human brain specimens are difficult to obtain. Colored plates of spinal cord relationships, autonomic system, cerebellar connections, and blood supply are most helpful, and are more revealing than lengthy verbal descriptions of these complex systems. Advanced students or graduate physical therapists will find Doctor Mettler's neuroanatomy a splendid and useful addition to their private libraries.

The Hospital Purchasing File. *Twenty-sixth Edition. Boards. Pp. 1350. Modern Hospital Publishing Company, 919 North Michigan Avenue, Chicago 11, 1948.*

This book is an excellent reference on hospital buying. It contains an alphabetical list of manufacturers and distributors, a directory of hospital products of more than 200 pages and a group of twenty-one manufacturers' catalogues classified on a departmental or service basis. This book is an excellent source of information and reference for those who are concerned with the services of supply, hospital operation and maintenance.

Rheumatic Fever Nursing Care in Pictures. *By Sabra S. Sadler, R.N., B.S., Consultant Nurse, Rheumatic Fever Program, Virginia State Health Department; Assistant Professor of Public Health Nursing, The Medical College of Virginia. Cloth. Price, $3.50. Pp 151, with 204 illustrations. J. B. Lippincott Company, East Washington Square, Philadelphia 5, 1949.*

This book is written and illustrated primarily for parents to supplement the services of the public health nurse. The average rheumatic fever patient with an initial attack of rheumatic fever is a child from nine to eleven years. So in this book the eleven-year-old girl was selected to represent this average type of patient over the country. All care and procedures must be based on the specific orders given by the physician for the particular patient. The illustrations are excellent. This book should be read by the parents, by the nurse and often by the physician.

How to Conquer Your Handicaps. *By Marie Beynon Ray. Cloth. Price, $3. Pp. 336. The Bobbs-Merrill Company, 724 North Meridian Street, Indianapolis 7, Indiana, 1948.*

Miss Ray, in this book, tells the stories of great men and women—from Demosthenes to Churchill, from Homer to Helen Keller, from Goya to Thomas Edison, from Elizabeth Browning to Franklin Roosevelt—whose success was due to their handicaps. Their handicaps gave them great opportunity.

A handicap is an asset. A handicap is a springboard to success. Everywhere about us we see those whose success is obviously due to their handicaps. A handicap gives us an inferiority complex. In the attempt to rid ourselves of this sense of inferiority, we put forth tremendous effort and so achieve heights we never would otherwise have attained. This is the psychological adjustment to a handicap.

The chapter "You and Demosthenes" is one of the many interesting ones. There are twelve million speech and voice cripples in the United States, about one-eleventh of the population. The author says: "A Demosthenes—a Churchill. The greatest orator who ever lived and the greatest orator of the modern world. Stutterers both."

"Winston Churchill," his biographer and former private secretary wrote, "was born with a palate defect which caused him to lisp and he grew up with a pronounced stutter as well. He has never fully cured the lisp. And the stutter still breaks out violently whenever he is excited—which is often. But on the public platform and before the microphone there is no stutter and the lisp is imperceptible, for there a miracle of will power somehow triumphs."

This book should interest physical therapists since they treat so many handicapped persons.

Meet Our New Contributors

Brown, Thelma, 6206 S. Champlain Ave., Chicago 37, Ill. Miss Brown attended Loyola University, and received her R.N. Degree from the Provident Hospital and Training School in 1931. She received her certificate of physical therapy from Northwestern University Medical School in 1946, and since that time has been employed as a physical therapist at Provident Hospital, Chicago, Ill. Member: American Physical Therapy Association, American Registry of Physical Therapy Technicians, American Nurses Association, Council Member of Joint Orthopedic Nursing Advisory Service, and Certified Public Health Nurse.

Ivy, Andrew C., University of Illinois, 1835 West Polk St., Chicago 12, Ill. Doctor Ivy holds the following degrees: A.B., B.Pd., State Normal School, Cape Girardeau, Mo., 1913: B.S. (1916), M.S. (1917), Ph.D. (1918), University of Chicago; M.D., Rush Medical College, 1922; D.Sc. (Hon.), University of Nebraska, Grinnell College (Iowa), 1947. He served as Instructor in Physiology, University of Chicago, 1917-19; Associate Professor of Physiology, Loyola University School of Medicine, Chicago, 1919-23; Associate Professor of Physiology, University of Chicago, 1923-25; Nathan Smith Davis Professor of Physiology and Pharmacology and Head of the Division of Physiology and Pharmacology, Northwestern University Medical School, 1925-46. Since 1946 he has been Vice-President of the University of Illinois in charge of the Chicago Professional Colleges, Distinguished Professor of Physiology and Head of the Department of Clinical Science. He served in the First World War, and as a consultant for several divisions of the U. S. Army during the Second World War. Memberships: Fellow, American Medical Association; Fellow (Life), American College of Surgeons; Fellow (Hon.), Gorgas Medical Society; Member (Hon.), Harvey Society of New York; Illinois State Medical Society; Chicago Medical Society; Institute of Medicine of Chicago (President, 1944); Chicago Society of Internal Medicine (President, 1942-43), Illinois Academy of Science, and others. He also holds the Gold Key of the American Congress of Physical Medicine (1947) and was awarded the special honor of Medalist by the American Roentgen Ray Society in 1946.

McElvenny, Robert T., Department of Bone and Joint Surgery, Northwestern University Medical School, 303 East Chicago Avenue, Chicago 11, Illinois. Doctor McElvenny received his M.D. Degree in 1932 from the University of Colorado. At present he is Attending Orthopedic Surgeon, Wesley Memorial Hospital, and Associate Professor, Department of Bone and Joint Surgery, Northwestern University Medical School, Chicago, Illinois. Member: American College of Surgeons, American Academy of Orthopedic Surgery, and Clinical Orthopedic Society.

Phillips, Clyde W., 426 East 51st Street, Chicago 15, Ill. Doctor Phillips received his B.S. Degree from Morehouse College in June 1943, and his M.D. Degree from Howard University in June 1946. He served as an Instructor in Surgery at Provident Hospital School of Nursing, and as a Research Fellow, Department of Gastro-Intestinal Research, Michael Reese Hospital, Chicago. At present he is Resident in General Surgery at Provident Hospital, Chicago, Ill.

Winters, Mrs. Margaret Campbell, 2227 Blair Blvd., Nashville, Tenn. Mrs. Winters graduated from the Presbyterian Hospital School of Nursing, New York City, in 1919. She also studied at Columbia University and the University of Chicago. Her physical therapy training was received in 1921 in the clinic of Dr. R. W. Lovett and W. G. Wright. She served as a physical therapist at Assistencia Publica, Montevideo, Uruguay, 1923-27; at Lakeside Hospital, Cleveland, Ohio, 1928-30; as chief physical therapist, University of Chicago Clinics, 1930-45, and since that time has been Assistant in Nursing, Vanderbilt University School of Nursing, Nashville, Tenn. Member: American Physical Therapy Association, American Registry of Physical Therapy Technicians, American Nurses Association, National League of Nursing Education, Past President, A.P.T.A.

Wolf, Lulu Kathryn, 1658 Camden Avenue, Los Angeles 25, Calif. Miss Wolf received her R.N. Degree from the Army Medical Center, Washington, D. C., in 1924; her B.S. from Columbia University in 1928; her certificate in nursing administration from Bedford College, University of London, London, England, in 1937, and her M.P.H. from Johns Hopkins School of Public Health in 1947. Formerly she was Professor of Nursing, Vanderbilt University School of Nursing, Nashville, Tenn. At present she is Chairman, Department of Nursing and Professor of Nursing, University of California at Los Angeles.

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